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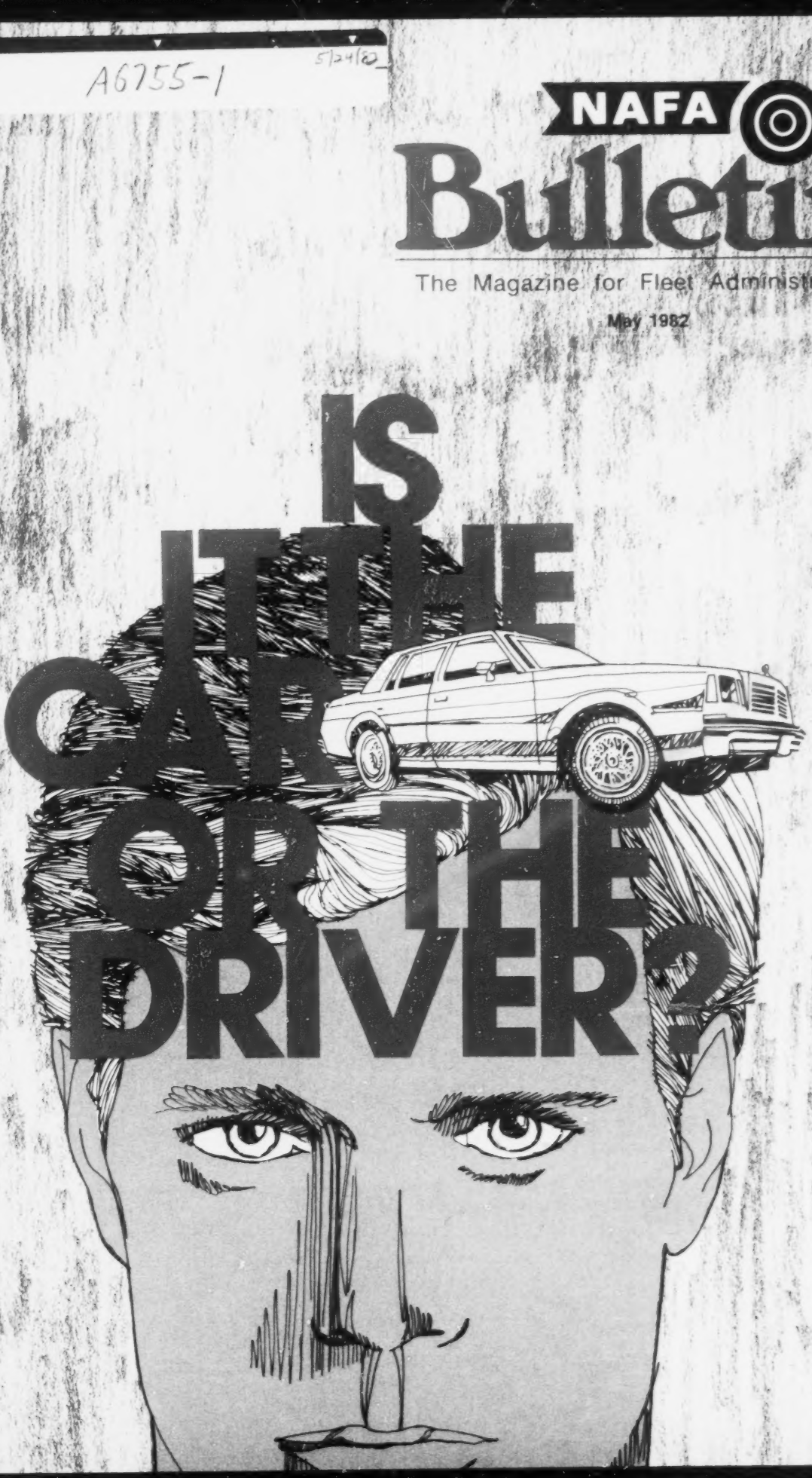
NAFA Bulletin

The Magazine for Fleet Administrators

May 1982

IS IT THE CAR OR THE DRIVER?



news highlights

Will Arco's Dropping of Credit Cards Spur Other Oil Firms to Follow?

The Atlantic Richfield Oil Company recently announced the discontinuation of credit cards in consumer transactions. According to an article in *The Wall Street Journal*, this action could affect credit policies at other major oil companies. If this does occur, it is bound to produce a variety of difficulties for the fleet administrator.

Arco's decision to phase out credit card services is expected to save the company approximately 73 million dollars a year — a savings which will be passed on to gasoline distributors through reduced prices. Arco hopes that this will make costs at the pumps decline as much as 3 cents per gallon, thereby permitting them to compete more effectively in the current price-competitive market. According to James F. Morrison, president of Arco's petroleum products division, the reduced gasoline prices should draw enough customers to compensate for market losses incurred by the abolition of credit.

Companies Honor Card

Following at the heels of Arco's announcement were offers extended by major oil companies to temporarily honor Arco credit cards. In the hopes of absorbing any customers Arco may lose, Gulf Oil Company will honor Arco cards providing the card holder fills out a Gulf card application. Sun Company will attempt to "buy" Arco card holders by offering up to $2.50 for any Arco customer willing to switch to Sunoco, and Texaco will extend special speedy credit card application procedures to ex-Arco customers.

Move Inspires Others

The central issue now is how Arco's action will affect the credit policy at the other oil companies. There are still certain industry analysts that maintain that Arco's decision may eventually inspire other companies to act similarly. It is considered prudent by some to get out from under the burden of mounting credit costs in today's tense economic atmosphere. Warren Shimmerlick, an oil industry analyst with Merrill Lynch claims that "In the environment of high interest rates, it probably makes sense for companies to get out of the credit business."

In an attempt to gauge fleet managers' reactions to Arco's decision, *NAFA Bulletin* compiled a random sampling of views from NAFA members and affiliates on the east and west coast. Opinion is divided, with some feeling that the chances are remote that other oil companies will follow Arco's lead, and others believing it could signal the beginning of the end of gasoline credit cards. This being the case, the time is ripe for fleet managers to confront the problems which could ensue from a cash-and-carry climate.

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NAFA Bulletin

Official Monthly Publication of The National Association of Fleet Administrators, Inc.
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Revising The Clean Air Act:

Major Provisions of Proposal H.R. 5252; What Effects Will It Have On You?

The Congress is now debating amendments to the Clean Air Act. The entire issue is very controversial and deserves careful consideration. At the present time the major proposal under discussion is H.R. 5252, a comprehensive new bill initially cosponsored by six members of the House of Representatives. They are Thomas Luken (Democrat, Ohio); Edward R. Madigan (Republican, Illinois); Bob Traxler (Democrat, Michigan); Elwood Hillis (Republican, Indiana); John Dingell (Democrat, Michigan), and James T. Broyhill (Republican, North Carolina).

The material in this article explaining the provisions in H.R. 5252 is based primarily on a publication prepared by the Motor Vehicle Manufacturers Association of the United States, Inc.

The Clean Air Act views man-made pollution in two main categories — emissions from fixed sources, such as factories or power plants, and emissions from mobile sources such as motor vehicles.

To achieve its goals, the Act authorized National Ambient Air Quality Standards, (usually referred to as NAAQS) and emission standards for specified sources and pollutants. The standards establish air quality levels that should be maintained to assure protection of the public's health and welfare. Emission standards establish the control levels for various sources to achieve these NAAQS.

According to the Environmental Protection Agency, highway vehicles in 1979 accounted for 12 percent of the total suspended particulates; two percent of sulfur oxides, 30 percent of the nitrogen oxides, and 72 percent of the carbon monoxide in the air as a national average.

The National Commission on Air Quality, created by Congress to evaluate Federal air pollution controls, in March 1981 reported:

"As a result of the Clean Air Act, total emissions from all classes of motor vehicles are reduced significantly... Motor vehicle controls under the Act have contributed to significant improvements in air quality."

According to the Motor Vehicle Manufacturers Association, H.R. 5252 proposes no changes in the standards for hydrocarbons, which are controlled to prevent smog. It would not alter the authority for California, with its special air problems, to set its own standards.

Federal automobile exhaust emission standards began in model year 1968 with new car control for hydrocarbons (HC) and carbon monoxide (CO). Oxides of nitrogen (NOx) control began in the 1973 model year.

Since these first standards were introduced, according to MVMA, manufacturers have made dramatic progress in responding to clean air objectives. By 1980, emissions of hydrocarbons had been reduced by 96 percent, carbon monoxide by 92 percent, and oxides of nitrogen by 51 percent. The standards for 1981 required a 96 percent reduction in both hydrocarbons and carbon monoxide and a 76 percent reduction in oxides of nitrogen. These are the ultimate levels of the current law now in effect.

MVMA declares, "These reductions have been achieved in a series of steps over the past decade in which manufacturers have been confronted with unnecessarily complicated engineering problems involved with these significantly different test procedures and six different sets of progressively more stringent standards."

According to the U.S. Bureau of Labor Standards, the cost of meeting the 1968 standards averaged about $16 per car. The cost of moving from the 1979 to 1980 standards was about $118. The cost of meeting 1981 standards averaged an additional $400 per car.

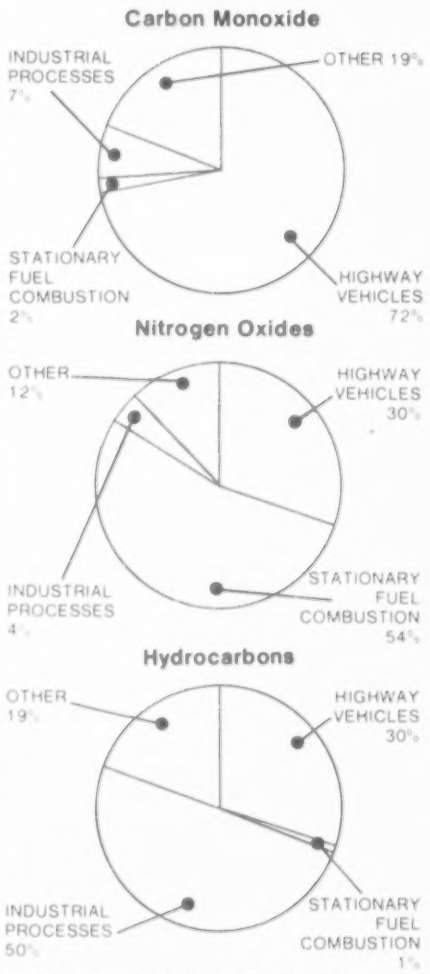
General Motors has estimated that 1981 auto standards, compared to 1980 standards, added $480 to the cost of 1981 GM cars.

CARBON MONOXIDE - A by-product of incomplete fuel combustion, carbon monoxide is a colorless, tasteless and odorless substance that displaces oxygen in the body. Especially at high concentrations in confined areas, it can be injurious to health. A National Ambient Air Quality Standard and a vehicle emission standard are set for carbon monoxide.

OXIDES OF NITROGEN - Vehicle emission standards are set for NOx to meet the National Ambient Air Quality Standard for nitrogen dioxide. Vehicle NOx emissions are a significant, but not major, contributor to the creation of nitrogen dioxide. NOx emissions are also ingredients in "smog" formation, but their role appears ambiguous. At times they appear to promote, while at other times they seem to inhibit, "smog" in urban areas.

HYDROCARBONS - Hydrocarbons are not generally considered an air quality problem as they leave the vehicle. Some hydrocarbons react in the atmosphere to promote the formation of photochemical "smog". Ozone concentration is generally used as the measure of the extent of the photochemical reaction. Thus, hydrocarbon emission standards have been set to meet the National Ambient Air Quality Standard for ozone.

SOURCES OF AIR POLLUTANTS NATIONAL EMISSIONS ESTIMATES 1979



SOURCE: Environmental Protection Agency, March 1981

MVMA has stated, "Meeting that last increment of control, moving from 92 percent to 96 percent reduction of carbon monoxide and 51 percent to 76 percent reduction of oxides of nitrogen, costs the consumer approximately 25 to 30 times more than the first major reduction — with little or no discernable air quality benefit from this last increment."

H.R. 5252 proposes retention of the 1980 standard, rather than the stricter 1981 standard. Manufacturers have estimated potential consumer savings ranging from $80 to $360 per car, depending upon the type of control technology used and the speed with which revisions to the law can be enacted.

In addition to the cash savings, the manufacturers have estimated that the retention of the 1980 standards would allow them to improve fuel efficiency up to another mile per gallon (in the range of two to five percent).

The major provisions of H.R. 5252 and the changes proposed in the Clean Air Act are:

Automobile Carbon-Monoxide Standard

The Clean Air Act establishes a carbon-monoxide standard of 3.4 grams per mile (g/m) for 1981 and later automobiles with provisions for manufacturers to request a waiver of up to 7.0 for certain 1981 and 1982 models. H.R. 5252 would re-establish the 1980 automobile standard of 7.0 g/m for 1982 through 1986 models with authority for the EPA administrator to revise the standard in subsequent model years, consistent with air quality needs.

In arguing for the change, MVMA declares "CO emissions have been sharply reduced and substantial air quality programs are being achieved. CO levels measured at 223 urban sites declined 36 percent between 1972 and 1979, according to EPA — and this occurred with the 15 g/m standard in effect only a few years.

"The 7.0 emission standard is a 92 percent reduction from pre-controlled levels. The replacement of older, less controlled cars with new models meeting the 1980 standard will make more stringent requirements unnecessary.

"The National Academy of Sciences, the National Commission on Air Quality and EPA estimate that the difference in the impact on air quality between the 3.4 and 7.0 standards for CO is negligible.

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Clean Air Act

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"A National Academy of Sciences study estimates that keeping the 7.0 g/m CO standard would reduce manufacturing costs by $30 to $60 per vehicle. Improved fuel economy would result because less complex catalyst systems could be used without any significant increase in CO emissions."

Automobile Oxides of Nitrogen Standard

NOx emissions are controlled primarily to achieve the National Ambient Air Quality Standard for nitrogen dioxide. The Clean Air Act established a NOx standard of 1.0 g/m for 1981 and later passenger vehicles. H.R. 5252 would reestablish the 1980 NOx standard of 2.0 g/m for model years 1982 through 1986, with authority for the EPA administrator to revise the standard after 1986.

In urging the change, MVMA says, "Outside of California, which sets its own vehicle standards, EPA has designated as non-attainment for NOx only two (of the 3,215) counties in the country — Denver and Chicago.

"...H.R. 5252 proposes no changes in the standards for hydrocarbons, which are controlled to prevent smog. It would not alter the authority for California, with its special air problems, to set its own standards."

"According to EPA estimates, total passenger car NOx emissions have decreased 13 percent between 1973 (the year that standards began) and 1979. The largest reduction occurred in 1979 as new cars meeting the 2.0 g/m standard (which started in 1977) began to have a significant impact on the total fleet as these vehicles replaced older units."

High Altitude Standards

Federal vehicle emission standards are set for sea level. EPA has set separate standards for 1982-1983 models sold in the 192 counties that are 4,000 feet or more above sea level. All of these counties are located in 11 Western states.

The standards require that emissions from new automobiles and light trucks sold in the high altitude areas be reduced by the same percentage as those at sea level. (These are the so-called proportional standards.)

However, beginning in model year 1984, all Federally certified cars must meet the same numerical standards whether sold at sea level or high altitude. H.R. 5252 would continue the present high altitude requirement for 1984 because it means that all of the new car fleet must be equipped to meet requirements designed to correct a situation occurring in areas involving only three to four percent of the vehicle population.

Compliance with such requirements might prevent some of the more fuel-efficient models, which cannot comply at high altitudes, from being available anywhere and may result in a substantial fuel penalty.

Heavy-Duty Truck Requirements

The Clean Air Act requires that in the next few years truck and bus emissions for HC and CO must be reduced by 90 percent while NOx must be reduced by 75 percent.

H.R. 5252 preserves the current standards for heavy-duty trucks but removes the requirement for specific fixed percentage reductions and permits EPA to adopt standards which provide for reasonable levels of control in terms of expected health effects, air quality, technological feasibility, costs and fuel economy.

The proposed legislation further provides that when standards for trucks are established they shall remain in effect for at least four years unless relaxed. Standards for NOx and particulate matter must be set simultaneously to allow for consideration of significant trade-offs involved in the control of these two pollutants for trucks. H.R. 5252 also allows the National Academy of Sciences to review the technical feasibility of any new proposed standard and requires such a review for any proposed standard for particulate matter.

The trucking industry favors the change because the current law is based on the assumption that heavy-duty trucks should be subject to the same percentage reduction as cars. The law doesn't reflect the fact that heavy-duty vehicles account for less than five percent of all motor vehicles on the road.

A recent report by the National Academy of Sciences, according to these sources, found that a 75 percent reduction in NOx was not feasible for heavy-duty diesel engines and there were significant fuel economy and environmental trade-offs involved in heavy-duty NOx controls.

The industry claims that a 90 percent reduction in HC and CO by heavy trucks would require costly catalyst technology (about $900 per truck) and, in fact, there are no catalytic converters currently developed that can survive the duty cycle of truck operations at present.

Criteria for Setting All Standards

The Clean Air Act has been interpreted to require that vehicle emission standards be established solely on the basis of ability to comply. H.R. 5252 requires that in setting more stringent standards EPA must consider relevant health effects information and studies dealing with the attainment of the applicable National Ambient Air Quality Standard. EPA will then set standards that are achievable through use of technology that has

been demonstrated to be available for the model year to which the standard applies.

H.R. 5252 also provides that EPA is to give appropriate consideration to such factors as costs of control technology, the applicability of technology to gasoline or diesel vehicles or engines, the impact of proposed standards on fuel economy, and the affect on the level of other pollutants.

Emission Control Warranties

The current Clean Air Act establishes a 5-year/50,000-mile production warranty and a performance warranty of varying duration depending on the parts covered. H.R. 5252 would establish identical durations of 2-year/24,000-mile limits for both warranties.

This proposal has been prompted by concerns about the adverse affect the current law has on aftermarket parts, independent service businesses, and consumers of the extended warranties.

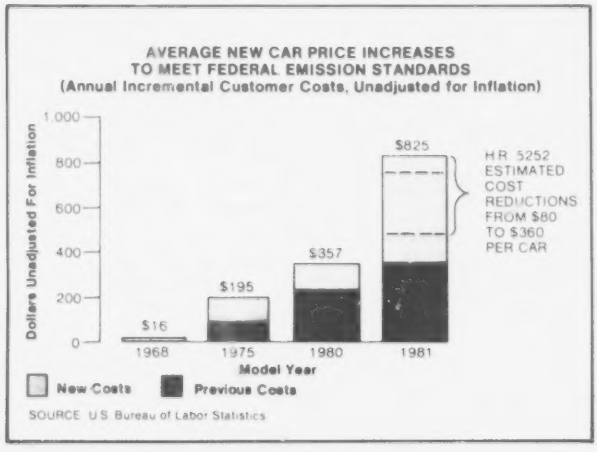
As the new bill is written it would not affect a manufacturers initial 5-year/50,000 mile-emissions system durability certification requirement or the EPA administrator's recall authority which extends for five years or 50,000 miles.

The new proposal would standardize state warranty requirements to provide uniformity with Federal requirements. According to MVMA, the amendment "is a fair compromise that adjusts the present Act to better balance air quality, marketplace and consumer interests."

Definition of Useful Life for Trucks

Under the Clean Air Act the "useful life" for passenger cars is defined as being half their average "total life," or five years or 50,000 miles. EPA, however, has mandated that the "useful life" for light- and heavy-duty trucks should be their "full life" or average period of use to engine retirement or rebuild. H.R. 5252 explicitly defines truck "useful life" as not to exceed one-half of the average actual life of any class or category of engines or vehicles.

According to MVMA, by changing "useful life" to "total life," EPA disregarded Congressional direction and increased the stringency of the emission standards. The "total life" concept will greatly increase the stringency of the deterioration factor which will have to be compensated for by lower initial emission levels.



Production Lead Time

Under the Clean Air Act the EPA administrator is directed to take into account lead time in establishing emission standards. H.R. 5252 would provide, when setting more stringent standards, minimum lead times of four years for new heavy-duty vehicles and engines and three years for all other new motor vehicles and engines.

"H.R. 5252 also provides that EPA is to give appropriate consideration to such factors as costs of control technology, the applicability of technology to gasoline or diesel vehicles or engines, and the impact of proposed standards on fuel economy..."

This proposed change in the law recognizes that a minimum lead time is needed to design and develop the changes in engine characteristics and in the technology necessary to meet stricter standards. A specified lead time permits the manufacturer to make changes in manufacturing processes and operations and to purchase and prepare any new test equipment and facilities.

Emission-Related Recalls

At the present time the Clean Air Act provides for the recall of vehicles or engines, which although properly maintained and used during their useful life, are found not to conform with emission standards.

H.R. 5252 would modify the Act to require that "a statistically valid and representative sample" be the basis upon which nonconformity is determined; require that only vehicles that are "maintained, used and adjusted to the manufacturer's specifications" be tested for determining whether non-conformity exists.

Averaging

"Averaging" has been fundamental to motor vehicle emission control regulations and ambient air quality measurements. The vehicle standards have been calculated to achieve reductions based on average emission levels from pre-controlled vehicles. It is the cumulative effect of total emissions — the average emissions of all in-use vehicles — rather than the output of an individual vehicle that has an impact on air quality. H.R. 5252 would expressly reaffirm the use of averaging as a basis for EPA mobile source regulation.

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Clean Air Act

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Unregulated Pollutants

At the present time the Clean Air Act requires manufacturers to determine whether unregulated emissions may "cause or contribute to an unreasonable risk to public health, welfare or safety." H.R. 5252 requires that EPA determine what is an unreasonable risk to public health and, if necessary, set new standards. The responsibility of the manufacturer to perform vehicle testing and report results to EPA is unchanged under the proposed legislation.

Certification Requirements

The Clean Air Act requires EPA to test vehicles, or to require the manufacturer to test them and demonstrate compliance with the standards before a certificate of conformity can be issued without which vehicles cannot be sold. H.R. 5252 would allow engineering evaluation as an alternative to vehicle testing and allow certificates to be issued for more than one year.

"At the present time the Clean Air Act requires manufacturers to determine whether unregulated emissions may 'cause or contribute to an unreasonable risk to public health, welfare or safety.'"

At the present time there is an elaborate schedule of reports, tests, mileage accumulation (4,000-mile and 50,000-mile fleets) and approvals outlined in complex EPA regulations for certification of emission systems. This schedule must be followed rigidly before a manufacturer can be granted a certificate of conformity. The certificate is valid for only one year, even if the same engine and emission control systems are to be installed in later year model cars and trucks.

MVMA asserts that "the current limitation on a certificate's applicability to a single model year compels a manufactuer to incur needless cost in an effort to obtain a certificate in each model year for a vehicle or engine whose emissions performance is essentially identical to the prior model year when the emission control requirements are the same."

Sale of New California Vehicles

EPA does not permit the sale of California-certified vehicles in the rest of the nation unless the vehicles also meet the Federal standards. H.R. 5252 would permit the sale of California vehicles in other states.

California sets vehicle emission standards based on its special problems as authorized by the law. These standards individually may be more stringent than Federal standards and must be collectively at least as protective of the public health and welfare as Federal standards. However, EPA precludes the sale of California-certified vehicles in the other 49 states. An amendment to the Clean Air Act, according to the manufacturers, is needed to allow the sale of California-certified cars anywhere in the United States to alleviate market disorders caused by EPA's interpretation of the Clean Air Act.

Compliance Procedures

The Clean Air Act authorized at least nine overlapping emissions-compliance enforcement programs. H.R. 5252 requires EPA to study the existing control programs, determine its efficiency, and, if appropriate, develop a "more practiceable approach" to the control of emission from mobile sources. EPA would be required to obtain public comment on any alternative approach and then submit a report on the study to Congress for approval before EPA could make any major revisions.

EPA currently employs two separate staffs and test laboratories to determine motor vehicle emissions compliance. The programs — preproduction certification, assembly line emission tests, and an after-production surveillance program — are complex, costly and burdensome to both industry and government, according to MVMA. In addition, there is no acceptable level of correlation between the three programs. ■

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NAFA

Bulletin

The Magazine for Fleet Administration

August 1982

1983 NEW CAR ACQUISITION SURVEY

BEST AVAILABLE COPY

The Executive Search Committee of the National Association of Fleet Administrators, Inc., is seeking an outstanding individual for the new position of *Deputy Director.*

The individual selected will function alongside our Executive Director, reporting with him to the President and Board of Trustees until his retirement.

NAFA currently has 27 chapters and 2,400 dues-paying members and affiliates in the United States and Canada. Headquarters is in New York City. The Association provides a full range of information and educational materials and programs to professional auto fleet administrators, the auto industry, governmental agencies, and other interested parties.

Previous association experience is highly desirable, but not mandatory. The position requires a confident, innovative self-starter, able to present and represent the Association well before all Publics, receptive to ideas and skilled at resolving conflicts.

You will require outstanding personal and professional references. You must have demonstrated experience and expertise in oral and written communication, people relations, budget management, event planning, and office management.

Only the very best will have the opportunity to fill the shoes of our present outstanding Executive Director.

To be considered, please submit a complete resume, with salary history, and three letters of recommendation to:

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National Association of Fleet Administrators, Inc.
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All inquiries will be acknowledged and held in strictest confidence.

letters

Haddon Disputes Innes's Safety Analysis

I am writing with reference to the article entitled, "Is it the Car or the Driver?" that appeared in the May issue of the *NAFA Bulletin*. The article was based on a presentation by J. Bruce Innes, Jr., given at a recent meeting of your organization's New York Chapter.

This paper is basically an attack on studies done by the Highway Loss Data Institute (HLDI) and Insurance Institute for Highway Safety (IIHS), which showed that small cars had worse injury and fatality experience than large cars and that the experience of domestic models was generally better than imported models. The paper does not contain well reasoned criticism of these studies, but instead is based on a complete misunderstanding of them and the methods of analysis used.

Amazingly, Innes attempts in the paper to build a detailed criticism of a HLDI study of insu-

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in this issue

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NAFA's 1983 Vehicle Acquisition Survey reflects the continued trend toward downsizing, with subcompacts and compacts representing 70% of the 1983 acquisition list.

Lipton's Walter Langseder: 35-Years of Service to the Profession 18
In both service to NAFA and dedication to a 35 year career as fleet manager for Thomas J. Lipton, Inc., Walter Langseder leaves behind a distinguished record of professional achievement. Now, on the verge of his retirement, this NAFA exclusive interview commemorates his service to the profession.

Unibody Repair: Costs and Technology 20
At NAFA's recent conference, Robert Devermann, vice president of Auto Damage Appraisers, spoke on the latest auto-repair technology brought about by the spreading popularity of unibody cars.

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NAFA's 1983 Acquisition Survey:

Small Cars Will Take 70% Of 1983 New Car Orders

NAFA Exclusive

Fleet car buyers will continue on the same course in 1983 that they have followed for the past few years. Compacts are the order of the day.

More than 70 percent of the new car orders in the 1983 model year will be for compacts and sub-compacts, according to NAFA's new car acqusition survey.

A total of 108 commercial fleets operating 82,272 passenger cars and 19 Canadian fleets with 10,760 vehicles participated in this year's survey.

Among the highlights of the study are:

- Twenty-one fleets are planning major changes in the size of car they will order for 1983. Fourteen are switching to compacts; two to mid-size and compacts from large cars; three are moving to mid-size cars, while two are switching back to mid-size cars from compacts.
- A total of 30 fleets are calling for major changes in the engines they will have in their new cars. Twenty-four fleets will be using four-cylinder engines; three are switching to diesels, and three to six-cylinder engines for their new cars.
- Four-door sedans and five-door hatchbacks will account for more than seven out of every 10 new car orders.
- Orders for bottom line models will increase from eight percent of the new car orders in 1982 to fourteen percent in the 1983 model year.

Drug & Cosmetic Group

This group is represented by 15 fleets operating 11,175 passenger cars (871 company owned, 10,304 leased). The current composition of the group's fleet is 35 percent compact cars, 56 percent mid-size cars, and 9 percent large cars. Only one fleet in the group has any sub-compacts in its fleet at the present time, accounting for less than one half of one percent of the total.

During the 1982 model year the fleets in the Drug & Cosmetic group acquired 4,425 new cars; for 1983 they plan to acquire 4,984 new passenger cars. Again, less than one half of one percent will be sub-compacts (all acquired by only one fleet); 51 percent will be compacts; 46 percent will be mid-size cars, and 3 percent large cars.

Ninety percent of the group's new car acquisitions will be either two-door or four-door sedans, with the remaining ten percent distributed between three-door hatchbacks, five-door hatchbacks, station wagons and sport models. Three fleets in the group plan to acquire specialty cars in the 1983 model year. Although four fleets reported they had a few imports in service at the present time, none said they were planning to acquire any more in 1983.

Of the 1983 model year cars being ordered by the Drug & Cosmetic Group, 12 percent will be bottom line models; 43 percent middle line cars, and 45 percent will be top of the line cars.

Four fleets in the group said they were planning to make major changes in the car size used in their fleets — three were switching from mid-size to compacts; while one was moving down from large and mid-size vehicles to mid-size and compacts.

Six fleets in the group said they were planning to change the engine used in their 1983 models. Five plan to switch to four-cylinder engines. One of the five planned to drop the diesel engine, while another fleet said it was going to use diesels in its new mid-size cars.

No fleet in the group was planning to order standard transmissions in its 1983 model year car; neither was any fleet planning to change its policy on equipping its cars with air conditioning — all new cars of every size will have this option as standard equipment.

Fourteen fleets reported that their operators had a choice of make or model they wished to drive. In one fleet, the operator was given a choice of engine.

Within this group, 10 fleet managers reported they were responsible for acquiring corporate vehicles assigned to executives; five are responsible for

NAFA Car Categories

Sub-Compact: Wheelbase of less than 100 inches and a curb weight of under 2,300 pounds.

Compact or Small: Wheelbase between 100 and 106 inches and a curb weight of between 2,300 and 2,799 pounds.

Mid-Size: Wheelbase between 106 and 114 inches with a curb weight of between 2,800 and 3,399 pounds.

Large: Wheelbase of more than 114 inches and a curb weight of more than 3,400 pounds.

acquiring executive pool cars, and two purchase personally owned cars for corporate executives.

Insurance Group

The Insurance Group is represented by 25 fleets operating 25,038 passenger cars (19,145 company owned, 5,893 leased). The current composition of the group's vehicles is 2 percent sub-compacts, 63 percent compacts, 33 percent mid-size, and 2 percent large cars.

During the 1982 model year this group acquired 8,993 new cars; for 1983 they plan to place 9,003 new vehicles into service. Three percent of their new cars will be sub-compacts; 81 percent will be compacts; 16 percent mid-size cars, and less than one half of one percent will be large cars.

Five fleets reported they are planning to make major changes in the size car they will use in their fleets. Four said they are planning to switch from mid-size to compacts while one said it was switching from large and mid-size to mid-size and compacts.

Fifty percent of the Insurance Group's 1983 model year new cars will be four-door sedans, while another 26 percent will be five-door hatchbacks. Two-door sedans will account for 11 percent of the new car orders, while the remaining 13 percent will be divided between three-door hatchbacks (5 percent), station wagons (7 percent), and sport models (1 percent).

Within the Insurance Group 17 percent of the 1983 model year cars will be bottom line models; 61 percent will be middle line cars, while 22 percent will be top of the line cars.

Three fleets in the group reported they plan to buy at least a few specialty cars, and two other fleets reported having a few imports in their fleet at the present time and both said they will acquire a few more during the 1983 model year.

Only two fleets in the Insurance Group reported they were planning to make any major changes in the engine used in 1983 model year cars. One is switching to four-cylinder engines for its new compacts, while the other is planning to use V-6 engines in its mid-size cars.

Two fleets are planning to order 1983 model year compact cars with standard transmissions. No fleet in the Insurance Group is planning to change its policy on ordering air conditioning for its new cars; the option is standard equipment on all cars ordered by almost every fleet in the group.

Sixteen fleets in the group give the operator some choice of car or equipment; 13 permit a choice (within limits) of the make of car to be ordered; nine permit the driver to select the model desired; one permits individual selection of the engine, and five will allow the driver to specify the transmission desired. Eight fleets give the operator the option of ordering additional equipment on the new car — and paying for it. In most fleets the choice is limited to vinyl roof and cruise control.

Sixteen fleet managers in the group reported they are responsible for acquiring corporate vehicles assigned to executives; 10 are responsible for acquiring executive pool cars, and six purchase personally owned cars for corporate executives.

Manfacturing-Consumer Group

The Manufacturing-Consumer Group is represented by 18 fleets operating 13,165 passenger cars (4,341 company owned, 8,824 leased). At the present time the composition of these fleets is two percent sub-compacts; 64 percent compacts; 25 percent mid-size, and 9 percent large cars.

The group acquired 4,971 1982 model year cars and plans to acquire 5,382 1983 model year cars. Five percent of the 1983 cars will be sub-compacts; 82 percent will be compacts; 11 percent mid-size, and 9 percent large cars.

More than 80 percent of the group's 1983 model year cars will be middle line vehicles; 17 percent will be top line cars, and only 2 percent will be bottom line cars.

Only two fleets in the Manufacturing-Consumer Group reported they were planning major changes in the size of car currently used. One fleet said it was switching from mid-size to compacts, while the other, which used mid-size, compact, and subcompact cars, reported it was moving back to mid-size cars for 1983.

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New Car Acquisition Survey

(Continued from page 9)

Fifty-five percent of the group's new car orders will be four-door sedans with another 12 percent going to five-door hatchbacks. Twenty-three percent of the orders will be for two-door sedans; station wagons will account for seven percent of the group's new car orders, with three-door hatchbacks getting one percent and sport models, two percent.

Eight fleets in the group plan to acquire some specialty cars during the 1983 model years. Three other fleets said they plan to acquire a few imports. Seven fleets reported they already have some imports in service.

Five fleets reported they are planning to change engines ordered for 1983 model year cars; four are switching to four-cylinder engines, while one will be ordering diesels in some new cars.

Only one fleet plans to use standard transmissions in its 1983 cars — compacts with four-cylinder engines. No fleet in the group is planning to change its air conditioning policy which now calls for that option to be standard equipment on practically all cars in every size category.

Thirteen fleets in the group give the operator some choice of car and equipment. Eleven permit a choice of make; nine the model desired; two allow the operator to select the desired engine, and seven give some leeway in ordering optional equipment — basically posi-trac axles and cruise control.

Twelve fleet managers in the group reported they are responsible for acquiring corporate vehicles assigned to executives; seven are responsible for acquiring executive pool cars, and five said they purchase personally owned cars for executives.

Manufacturing-Industrial Group

The Manufacturing-Industrial Group consists of 19 fleets operating 18,385 passenger cars (4,479 company owned, 13,906 leased). The current composition of the group's fleet is 7 percent sub-compact; 51 percent compact; 38 percent mid-size, and 4 percent large cars.

During the 1982 model year this group put 5,987 new cars into service. For the 1983 model year the Manufacturing-Industrial Group plans to acquire 6,345 new cars. Twenty-four percent of the new cars will be sub-compacts; 52 percent will be compacts; 21 percent will be mid-size cars, and 3 percent will be large cars.

Five fleets in the group reported they are planning to make major changes in the car size ordered in 1983.

Sixty percent of the Manufacturing-Industrial Group's new car orders will go to four-door sedans; another 23 percent will be for five-door hatchbacks. Of the remaining 17 percent, 11 percent will be for station wagons, five percent for two-door sedans, and one percent for three-door hatchbacks.

Fifty-three percent of the group's orders will be for middle line cars; 36 percent for top of the line vehicles, and 11 percent for bottom line cars.

Eight fleet managers in the group said they were planning to change engines for 1983. Six reported they were switching to four-cylinder engines in compacts; one said the switch would be to diesels; the other is planning to use six cylinder engines rather than V-8's.

Five fleets in the group are planning to use standard transmissions in their 1983 model cars, primarily in compacts and sub-compacts with four-cylinder engines. However, no fleet in the group is planning to change its policy on air conditioning which is now standard equipment on every car in every size category in the group.

Seventeen fleets in the Manufacturing-Industrial Group reported their operators have some choice of car or equipment. Sixteen can choose the make desired from a selector list; nine have a choice of model; one can select the engine, and six the transmission. Ten fleets give the operator a choice in ordering additional equipment or accessories for the company-provided car. In most fleets this is limited to vinyl roofs and posi-trac axle.

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U.S. Composite Survey Fleet
1979-1982 Model Years

	1979	1980	1981	1982
Number of Cars in Fleet	806	794	750	762
Current Composition of Fleet				
Sub-Compact	8	24	15	23
Compact	210	234	248	404
Mid-Size	451	429	420	282
Large	137	103	67	53
Actual Previous Year Acquisitions	316	303	284	274
Planned New Car Acquisitions	336	308	302	284
Sub-Compact	7	31	21	19
Compact	174	154	205	185
Mid-Size	128	108	67	74
Large	27	15	9	6

U.S. Composite Fleet

According to the survey responses, the composite fleet of the survey participants consisted of 762 units composed of:

Sub-Compacts	**23**
Compacts	**404**
Mid-Size	**282**
Large	**53**

These fleets plan to acquire 284 new cars during the 1983 model year. They will be distributed among the size categories in this way:

Sub-Compacts	**19**
Compacts	**185**
Mid-Size	**74**
Large	**6**

New Car Acquisition Survey

(Continued from page 10)

Fourteen fleet administrators reported they were responsible for acquiring corporate vehicles assigned to executives; 11 are responsible for acquiring executive pool cars, and seven said they purchased personally owned cars for executives.

Chemical & Petroleum Group

The Chemical & Petroleum Group is represented by 12 fleets operating 8,255 passenger cars (4,799 company owned, 3,456 leased). At the present time the composition of these fleets is 29 percent compacts; 42 percent mid-size cars, and 29 percent large cars. One fleet reported having a few subcompacts in service, but they account for much less than one half of one percent of the total fleet.

During the 1982 model year the group acquired 2,501 new cars; for 1983 they plan to put 2,556 new cars into service. Thirty percent of the 1983 model year cars will be compacts; 61 percent will be mid-size cars, and 9 percent will be large cars. No fleet in the group said it was planning to order subcompacts in 1983.

Forty-one percent of the group's new cars will be bottom line vehicles (the largest percentage of any sales and service group); 58 percent will be middle line cars, while only one percent will be top of the line models.

An amazing 97 percent of the Chemical & Petroleum Group's new car orders will go to four-door sedans. Five-door hatchbacks, station wagons, and two-door sedans will each account for one percent of the group's new car orders.

Three fleets in the group said they now have a few imports in service, no fleet in the group reported it was planning to acquire any imports during the 1983 model year.

Four fleets said they were planning to make major changes in the size of car acquired in 1983. Two reported they were switching from large to mid-size cars; one is switching from mid-size to compacts, while the fourth said it was dropping large cars and moving to both compacts and mid-size ones.

Five fleets said they were planning to change engine sizes for 1983. Four are switching to four-cylinder engines, while one is planning to use six-cylinder engines instead of V-8's.

No fleet in the group is planning to use standard transmissions in its 1983 cars and none is planning to make any changes in its policy of ordering cars with air conditioning, now a standard item on almost all cars in every fleet.

Ten of the 12 fleets give the operator some choice of car and equipment. All 10 permit the operator to choose the make desired; two allow choice of model, and six permit the driver to order extra equipment or accessories.

Eleven of the 12 fleet managers in the Chemical & Petroleum Group reported they were responsible for acquiring corporate vehicles assigned to executives. Six are also responsible for acquiring executive pool cars, but none purchase personally owned cars for corporate executives.

Food & Beverage Group

The Food & Beverage Group is represented by nine fleets operating 3,246 passenger cars (1,968

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1983 New Car Acquisition Survey Summary

		Current Composition								Fleet Acquisition by Category			
Group	Number of Cars	Owned	Leased	Sub-Compact	Compact	Mid-Size	Large	1982 New Car Acquisitions	1983 Planned New Car Acquisitions	Sub-Compact	Compact	Mid-Size	Large
U.S. SALES & SERVICE													
Drug & Cosmetics (15)	11,175	871	10,304	31	3,933	6,262	949	4,425	4,984	5	2,543	2,300	136
Insurance (24)	25,038	19,145	5,893	538	15,852	8,170	478	8,993	9,003	312	7,258	1,425	8
Manufacturing—Consumer (18)	13,165	4,341	8,824	218	8,4808	3,265	1,202	4,971	5,382	277	4,419	592	94
Manufacturing—Industrial (19)	18,385	4,479	13,906	1,319	9,280	7,027	755	5,987	6,345	1,565	3,293	1,315	172
Chemical & Petroleum (12)	8,255	4,797	3,456	2	2,358	3,490	2,405	2,501	2,481	—	736	1,512	233
Food & Beverage (9)	3,246	1,968	1,278	23	2,529	561	133	1,666	1,487	—	1,217	228	42
Miscellaneous (11)	3,008	1,151	1,857	25	869	1,586	528	1,087	989	21	427	457	84
Total (108)	82,272	36,754	45,518	2,156	43,305	30,361	6,450	29,630	30,671	2,180	19,893	7,829	769
CANADA													
Sales & Service (17)	3,560	990	2,570	20	1,635	1,280	625	1,174	1,254	6	685	298	60
Government (2)	7,200	7,200	—	200	4,200	400	2,400	1,880	1,800	75	875	150	700
Total (19)	10,760	8,198	2,570	220	5,835	1,680	3,025	3,054	3,054	81	1,560	448	760
Grand Total (127)	93,032	44,944	48,088	2,376	49,140	32,041	9,475	32,684	33,725	2,261	21,453	8,277	1,529

(Continued from page 12)

company owned, 1,278 leased). The current composition of the group's fleet is 1 percent sub-compacts; 78 percent compacts; 17 percent mid-size cars, and 4 percent large cars.

The group placed 1,666 new cars in service during the 1982 model year; for 1983 the fleets plan to acquire 1,487 new cars. None of the new cars will be sub-compacts; 82 percent will be compacts; 15 percent mid-size cars, and 3 percent large cars.

Fifty-five percent of the new car orders will be four-door sedans with another 28 percent going to five-door hatchbacks. The remaining 17 percent of the orders will be divided up between three-door hatchbacks (eight percent), station wagons (six percent), and two-door sedans (three percent). No fleet in the group is planning to order sport models.

One fleet in the group is planning to acquire a few specialty models and one reported it will acquire some imports. At the present time three fleets in the Food & Beverage Group have some imports in their fleets.

None of the fleet managers in the group reported that they were planning to make major changes in the size of car acquired during the 1983 model year.

One fleet manager said there would be a change in vehicle engines in the 1983 model year — a switch to four-cylinder engines. No fleet in the group is planning to use standard transmissions in its 1983 model year cars, and none are planning to change their air conditioning policy.

Five fleets in the group reported that they give their company-car operators some choice of car and equipment. Five permit choice of make of car; four permit choice of model, while three permit the driver to select some accessories and extra equipment. Items most often made available (at extra cost to the driver) are vinyl roof, posi-trac axle, and cruise control.

Five fleet managers reported they were responsible for acquiring corporate vehicles assigned to executives; four said they were responsible for acquiring executive pool cars, and four said they purchased personally owned cars for executives.

Miscellaneous Group

The Miscellaneous Group consists of 11 diverse fleets that do not fall into any of the association's primary classifications. They include agricultural and forest products; real estate; banking; mass merchandising, and an automobile club. These fleets operate 3,008 passenger cars (1,151 company owned, 1,857 leased). The current composition of the group's fleet is sub-compact, 1 percent; compact, 29 percent; mid-size, 53 percent, and large cars, 17 percent.

During the 1982 model year the group acquired 1,087 new cars. During the 1983 model year they plan to put 989 new cars into service. Of these, 2 percent will be sub-compacts; 43 percent compacts; 46 percent mid-size, and 9 percent large cars.

New Car Orders By Body Style — U.S. Fleets
(percentage of new car orders)

3-door hatchback	3%
5-door hatchback	17%
station wagon	7%
2-door sedan	14%
4-door sedan	55%
sport model	1%

Only one fleet in the group said it was planning to make any major changes in the size car used in its fleet; it is switching from mid-size to compacts.

Sixty-four percent of the group's new car orders will go to four-door sedans with another 9 percent for five-door hatchbacks. Thirteen percent of the new car orders will be for two-door sedans; nine percent for station wagons, and five percent for three-door hatchbacks.

Two fleets in the group reported they have some specialty cars in operation, while two others say they have some imports in their fleets. However, only one fleet said it planned to acquire any imports during the 1983 model year.

Three fleets reported they are planning to change engines for 1983. They are switching to four-cylinder engines for compacts and mid-size cars. One fleet said it was planning to use standard transmissions in the sub-compacts and no fleet will change its air conditioning policy.

Seven fleets in the Miscellaneous Group said their operators have some choice of car and equipment. All seven said the driver could select the make desired; three permitted a choice of model, and five allow the operator to select accessories and extra equipment. The item most often selected, according to the fleet managers, is cruise control.

All 11 fleet managers in the group said they were responsible for acquiring corporate vehicles assigned to executives, however, none was responsible for acquiring executive pool cars, and only one purchased personally owned cars for executives.

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New Car Orders By Size and Line
U.S. Fleets
(percentage of new cars being ordered)

Car Size	Total	Line Top	Line Middle	Line Bottom
Sub-Compact	7%	*	6	1
Compact	65%	14	40	11
Mid-Size	25%	9	15	1
Large	3%	1	1	1
Total	100%	24%	62%	14%

*Mentioned but less than ½ of 1%.

New Car Acquisition Survey

(Continued from page 14)

Canada

There are 19 Canadian fleets represented in the 1983 model year new car acquisition survey. They have a total of 10,760 passenger cars (8,190 company owned, 2,570 leased). It should be pointed out that two of these 19 fleets are very large government units with 7,200 vehicles.

The sales and service fleets in the Canadian Group have a total of 3,560 units of which 990 are company owned and 2,570 leased. The current composition of the commercial fleets is 1 percent sub-compact, 46 percent compact, 36 percent mid-size, and 17 percent large cars. During the 1982 model year the commercial fleets acquired 1,174 new cars; in the 1983 model year they plan to put 1,254 new cars in service.

Of the new cars that will be acquired in the 1983 model year, 1 percent will be sub-compacts, 65 percent will be compacts, 28 percent, mid-size, and 6 percent, large cars.

Sixty-eight percent of the 1983 models that will be ordered are going to be four-door sedans; 13 percent will be two-door sedans, 15 percent station wagons, 2 percent each three-door hatchbacks and sport models.

Four fleets reported they had some specialty models in service, while two fleets said they had some imports in operation. One fleet manager responded to the question by saying, "In Canada all cars are imports."

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Standard Equipment On All Cars

(At No Charge to Operator)

Group	Radio	Power Disc Brakes	Power Steering	Automatic Trans.	S/B/R Tires	Air Cond.	Tinted Glass	Vinyl Roof	Posi-Trac Axle	Headbolt Heater	Cruise Control
Manufacturing-Industrial											
Large (9)	9	*	*	*	7	9	9	2	1	—	9
Mid-Size (15)	15	14	15	15	12	15	15	1	2	2	10
Compact (16)	16	16	16	16	13	16	16	1	1	1	12
Sub-Compact (7)	7	7	7	7	3	7	7	—	1	—	5
Manufacturing-Consumer											
Large (10)	10	*	*	*	9	9	9	7	1	1	7
Mid-Size (11)	11	10	11	10	11	11	10	4	1	2	7
Compact (16)	16	15	16	15	13	16	15	1	—	3	11
Sub-Compact (3)	3	3	3	2	2	3	3	—	—	—	2
Food & Beverage											
Large (5)	5	*	*	*	4	5	5	2	1	1	3
Mid-Size (6)	6	5	6	6	5	6	6	2	1	1	4
Compact (9)	9	8	9	9	7	8	7	—	—	1	4
Sub-Compact (2)	2	1	2	2	2	2	2	—	—	—	1
Chemical & Petroleum											
Large (10)	10	*	*	*	7	9	9	3	1	—	9
Mid-Size (10)	10	10	9	7	7	9	10	2	2	1	9
Compact (6)	6	6	5	4	4	6	6	—	—	—	4
Sub-Compact (1)	1	1	1	1	1	1	1	—	—	—	1
Insurance											
Large (10)	10	*	*	*	8	9	9	3	1	1	4
Mid-Size (17)	17	17	17	17	11	17	16	2	—	2	7
Compact (21)	21	21	21	21	15	21	20	2	—	3	10
Sub-Compact (5)	5	5	5	5	4	5	5	1	—	—	3
Drug & Cosmetics											
Large(7)	7	*	*	*	6	7	7	3	—	—	4
Mid-Size (14)	14	14	13	14	12	14	14	3	—	1	9
Compact (11)	11	11	11	11	9	11	11	2	—	1	7
Sub-Compact (1)	1	1	1	1	1	1	1	—	—	—	—
Miscellaneous											
Large (11)	11	*	*	*	9	10	9	6	1	1	8
Mid-Size (11)	11	11	11	11	10	11	9	2	—	1	7
Compact (7)	7	7	7	7	6	6	5	—	—	—	3
Sub-Compact (5)	5	4	4	4	4	4	3	—	—	—	—
Canada											
Large (12)	12	*	*	*	8	11	12	5	2	6	4
Mid-Size (16)	16	16	16	14	12	15	12	2	1	10	5
Compact (12)	12	12	12	11	8	9	9	—	—	7	2
Sub-Compact (5)	5	4	4	3	2	3	3	—	—	1	1

NOTE: The figure in ( ) beside the car size indicates the number of fleets in each group ordering that size car. The number under the items of equipment is the number of fleets in each group ordering the item for every car of that size at no expense to the operator.

*Standard equipment on Large cars.

Air Conditioner Maintenance

In response to many hotline caller inquiries regarding air conditioning problems, Joe Alacchi offers these helpful comments on air conditioning maintenance and diagnosis.

Air conditioning cools primarily by lowering the humidity. Therefore, while the air leaving the ducts may be very cool or even cold, the temperature of the vehicle may be only a few degrees cooler than the outside ambient air. The passenger feels cool due to the lowering of the humidity. An air conditioner, while operating on refrigeration principles, is not a refrigerator.

There are several quick checks that can be made to verify the soundness of the air conditioner's operation. Set the blower to HI; set the air conditioner control (A/C) to MAX, and the temperature control to COLD. With the engine at normal operating temperature, increase the engine speed to fast idle and feel the temperature of the air leaving the air conditioning ducts. It should feel cool to cold.

Another method is to insert a thermometer into the outlet duct and compare the temperature with that of the outside air. At 80° ambient, a duct temperature of about 34° to 42° would be considered normal. Higher humidity will tend to cause higher duct temperatures. With a cycling clutch air conditioning system this discharge temperature should be taken just before the clutch disengages.

The most accurate method is to compare the compressor high pressure to the evaporator pressure while comparing the ambient temperature to the duct air temperature.

An alternate method that is quick and effective can be executed while the engine is at normal operating temperature and running at normal (curb) idle. Set the selector control to "NORM"; set the "TEMP" control to full "COLD" and the blower on "HIGH." "Hand-feel" the temperature of the evaporator inlet line *and* the accumulator surface while the compressor is engaged. If both are equally cool, and cooler than the ambient air, the system is functioning properly. If the inlet pipe feels cooler than the accumulator surface, or if the inlet pipe has an accumulation of frost, this indicates a low refrigerant charge.

While most manufacturers suggest a procedure for adding refrigerant, the better method would be to completely discharge the system, correct the leak, and evacuate and recharge the system with the proper amount of refrigerant. The logic is that a loss of refrigerant indicates a leak. A leak, even the

New Car Acquisition Survey

(Continued from page 16)

Six Canadian fleets reported they are making major changes in the car size being ordered for 1983. Three are moving down from large to mid-size cars, while the other three were switching from mid-size to compacts.

Three Canadian fleets reported they are planning engine changes for the 1983 model year. All three are switching from 8's to 6-cylinder power plants. No Canadian fleet is planning to order standard transmissions on its 1983 model year cars and none are planning to change their policies on use of air conditioning.

Twelve of the 17 Canadian sales and service fleets give the operator some choice of car and equipment. All 12 permit choice of make; 10 allow choice of model, and 8 allow the driver to add extra equipment and accessories to the company-provided car.

By far the most widely chosen piece of optional equipment is cruise control.

All 17 Canadian fleet managers reported they are responsible for acquiring corporate vehicles assigned to executives; four are responsible for acquiring executive pool cars, but only one purchases personally owned cars for corporate executives. ■

Lipton's Walter Langseder

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ing people; getting people to do as you wish. That's the trick. I have found that if you give a person something they dislike, they are going to tell you what is wrong with it. But, if you give them something palatable, they will make it work.

"Making a career in fleet management really depends on how far you want to go with it. The building blocks are judged by the fleet manager's responsibilities. If you only have one of the four responsibilities I mentioned earlier, you cannot command the same considerations that someone who has all four responsibilities can. If you have the building blocks for all four, you can reach any height you wish.

"With some mechanical and accounting background, the ability to express yourself, creativity, and the ability to see the problem and find its solution, you can be a successful fleet manager and gain recognition and support from management."

When asked if he had to do it all over again, what would he do differently, Walt replied, "Nothing. It's been a wonderful and rewarding experience."

On behalf of the officers and members of the National Association of Fleet Administrators, Inc., we wish Walt all the best of luck in the future. ■

DOT's Analysis:

Placing a Price

This article is based on a report, "The Cost of Automobile Safety Regulations," published by the Office of Program and Rulemaking Analysis, National Highway Traffic Safety Administration, U.S. Department of Transportation. It provides a rare insight into the thinking of the Federal department most directly concerned with rules and regulations relating to automotive safety and obviously reflects the government's point of view on the cost of vehicle safety standards.

Over the past 12 years the National Highway Traffic Safety Administration (NHTSA) has issued more than 50 motor vehicle safety standards. These standards were issued in an effort to decrease the incidence of motor vehicle accidents and to provide increased protection for occupants when accidents did occur.

Changes made in response to these standards (by the manufacturers) have improved motor vehicle safety in numerous ways, including improved windshield penetration resistance, collapsible steering columns, interior padding, lap and shoulder belts, side marker lights, head restraints, reduced flammability of interior materials, side-door strength, improved brakes, and leak resistant fuel systems.

These are significant safety benefits, in terms of the reduced fatalities and injuries associated with these changes. It is estimated (by NHTSA) that motor vehicle safety standards have resulted in the reduction of at least 83,000 deaths in the 1966-1981 period. As newer, safer vehicles replace the older, less safe ones, about 10,000 additional lives will be saved each year. It is estimated that a 1982 model year car is about 25 percent safer — in protecting occupants from injury or death — than a pre-standards, model year 1965 or earlier car.

As with all goods and services, there are costs associated with these benefits that are ultimately borne by the average consumer. This report will examine the nature of these costs, those that directly increase the price of the automobile as well as those that come from indirect influence on the overall economy. The purpose is to inform the public of the relative price they are paying for vehicle safety and provide a perspective on the nature of the cost burden to motor vehicle manufacturers.

Direct Cost of Safety Regulations

When an automobile manufacturer initiates changes that improve the safety of a vehicle, it will usually incur higher production costs for that vehicle. These increased costs reflect the additional labor, materials, investment, design, and testing that are necessary to comply with federal standards. These costs, which will be referred to as direct manufacturing costs, are the most visible and usually the most significant costs associated with federal safety standards.

This report identifies and discusses six components of the direct costs of NHTSA's automobile regulations. They are 1) variable costs; 2) capital costs; 3) research and development costs; 4) engineering and launch costs; 5) compliance testing costs, and 6) administrative costs.

Variable Costs

Variable costs basically are those that vary with production volume. Safety regulations often result in the addition of new equipment or the strengthening of structural components. Such changes are typically accomplished by adding or changing material, which sometimes increases the complexity of the assembly process. The additional labor and materials that are needed to install a safety feature are the primary examples of the variable costs that result from safety regulations. Other less significant variable costs include additional energy usage, scrappage (defective production that must be discarded) and wastage (excess, unusable materials). Overall, these costs account

on Safety

for about 63 percent of the final price charged to consumers.

An examination of company financial statements indicates that variable costs represent 75 percent of net sales. Net sales revenue is derived from manufacturer wholesale price levels. Industry data indicate that weighted average dealer discount for domestic manufacturers is 19 percent. That is, the retail list price of a new automobile is, on average, 19 percent higher than the price the dealer paid to the manufacturer.

NHTSA estimates that about $370 of the price of a 1982 automobile is a result of federal safety regulations. This amounts to an annual consumer cost of about $3.7 billion (assuming sales of 10 million annually). The variable cost portion of this amount is about $2.3 billion annually in higher labor, materials, and energy costs to meet federal safety standards.

Capital Costs

The incorporation of new safety features in a vehicle can result in redesign of certain vehicle systems. When this occurs, manufacturers must invest in new tooling or equipment to produce the newly designed systems, or in new or redesigned plants and facilities.

Unlike variable costs, capital costs are directly associated with short term fluctuation in production volume; they are directly related to planned production volumes and as long as those production capacities are not exceeded, they will remain "fixed" regardless of the number of vehicles sold. Although capital expenditures are usually incurred in a given year, their cost is charged to the product as the assets' useful life is used up. Typically, for tooling this takes three to five years. It may be as long as 20 years for the investment in a new plant. Thus, an investment of $100 million for tooling in 1980 may be allocated to the production of 1981, 1982, and 1983 as well.

In recent years the domestic industry has initiated extensive downsizing programs to meet fuel economy standards. It is possible that some of the new tooling needed for these programs was more costly than it would have been in the absence of safety requirements. Bumpers, for example, might have been smaller and less complex and new tooling would still be required for features such as side door beams and head restraints. To some extent, additional recurring capital costs may be associated with subsequent redesigns of vehicles that already meet safety requirements. It is not possible to make any estimate of such costs.

If enough leadtime is provided, many safety changes can be made with minimal or no increases in capital costs. Manufacturers periodically redesign their vehicles every four to five years to incorporate both styling changes and major performance improvements. In recent years redesign programs have been accelerated to meet the demand for fuel efficient vehicles. To meet safety standards it may be necessary to change the thickness or shape of a vehicle structure. If such changes are made before the vehicle is redesigned, significant retooling costs may be necessary. However, if adequate leadtime permits the manufacturer to incorporate the safety requirements in the normal redesign cycle, no additional tooling may be necessary to meet the safety standard.

Research and Development Costs

Before the final design of a new safety feature can be completed, research and testing must be done to establish the most practical approach to meeting the new requirement. Like capital costs, these costs do not vary with production. However, unlike capital costs, they are charged only to the year in which they occur. There is very little data available to establish the amount of research and development expense that is associated with safety regulations. The only publicly available figures that break out a similar cost are those from General Motors' latest 10K report to the Securities and Exchange Commission. This indicated that in 1980, GM spent about $468 million on research, engineering, reliability, inspection, and testing for automotive safety.

Table 1
General Motors R&D Expenditures
(Millions of Dollars)

	Total R&D Expenditures	R&D Expenditures for Safety	Percent of Total R&D for Safety
1975	1114	273	24.5
1976	1257	316	25.1
1977	1451	379	26.1
1978	1633	420	25.7
1979	1950	464	23.8
1980	2225	468	21.0

Source: General Motors 10K report to the Securities and Exchange Commission.

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Placing a Price on Safety

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Engineering and Launch Costs

After the research department has determined the most practical and economically feasible approach to a specific safety problem, manufacturers must invest resources in the design and development of the new safety systems. The necessary changes must be designed, prototypes must be built and tested, and preparations made for assembly line production. Like research and development costs, these are fixed costs that are charged to the year in which they occur. NHTSA estimates that engineering and launch costs average about 40 percent of capital costs for the major domestic manufacturers. NHTSA has estimated tooling costs to be about $92 million a year and engineering and launch costs to be about $37 million annually.

Compliance Testing

In order to assure that these redesigned vehicles will, in fact, satisfy the requirements of a safety standard, manufacturers must put their vehicles through a compliance testing program. Costs involved in determining compliance include equipment, facilities, personnel, test vehicles, and prototype models. Testing costs will vary, depending on the nature of the standard. The most expensive type of testing would involve destructive crash testing of prototype vehicles. Eight motor vehicle safety standards are tested for compliance through destructive testing. Some of these requirements involve multiple tests, but others can be combined with tests for different standards or the testing done to insure normal product safety levels.

Administrative Costs

In order to support the development, production, and reporting requirements of a federal safety standard, manufacturers must incur some level of administrative burden. The costs associated with safety standards include the salaries of managers, lawyers, clerks, typists, etc., whose skills are needed to address the various issues and requirements associated with safety standards. No comprehensive data is available to estimate the total administrative cost of regulations. A very rough estimate has been developed from data supplied by GM in a letter to then President Carter in 1978. In this letter GM listed their total administrative costs for all forms of regulation including vehicles, plant and facilities, and occupational health and safety, for the years 1974, 1975, and 1976. During this time, GM's total administrative costs averaged about $200 million annually. According to NHTSA, safety regulations would be responsible for about 40 percent of the total administrative expenditures.

Table 2
Ratio of Variable Costs to Net Sales
1970-1980

	GM	Ford	Chrysler	Total Domestic New Car Sales (Millions)
1970	68.2	73.0	79.8	7.1
1971	65.0	73.0	77.8	8.7
1972	64.8	74.0	79.9	9.3
1973	66.4	75.0	79.6	9.7
1974	71.5	80.0	86.1	7.4
1975	72.4	81.1	89.5	7.1
1976	69.6	78.0	81.5	8.6
1977	69.2	77.0	83.9	9.1
1978	69.6	78.6	86.4	9.3
1979	71.9	79.5	90.5	8.3
1980	76.0	84.9	93.7	6.6

Consumer Prices

Obviously the costs are translated into higher automobile prices for the consumers. Various estimates have been made of the current consumer cost of safety regulations. In 1981 GM Chairman Roger B. Smith put the cost at $425 per automobile. The Center for the Study of American Business at Washington University in St. Louis estimated (in 1977) that the cost of required safety equipment was about $422. In current dollars, this would be about $633.

The basis for the 1977 estimate of $422, and possibly for some industry estimates, is data collected by the Bureau of Labor Statistics for use in deleting the cost of automobile safety improvements when computing the Consumer Price Index. These costs are deleted because they are considered to represent increased consumption rather than higher prices for the same vehicle. That is, the higher prices for a safer car are presumed to reflect a greater utility to the public and are thus, by definition, not inflationary. The Bureau of Labor Statistics would yield an increase of $515 to the price of a 1981 car. This increase included all standard-related cost increases, including those first made in 1968 (about $50 worth) but excludes voluntary changes made by manufacturers which are not related to safety regulations.

In assessing the significance of price changes caused by safety requirements, other causes such as inflation must also be considered. In 1975, BLS began publishing the average price increase of the new automobile sample used in compiling the Producer Price Index. By comparing these overall increases with the corresponding assessment of safety standard costs, we can estimate the relative contribution of safety requirements to rising automobile prices.

All of these factors, together with the cost of environmental and safety standards, have contributed to higher automobile prices. Because of

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Placing a Price on Safety

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the magnitude of recent mid-year increases (which are pure price increases and contain no new required safety or emissions equipment) it is likely that the safety standards are actually responsible for a smaller percentage of recent price increases.

It should be noted that in recent years economic conditions have not allowed manufacturers to recoup all of their manufacturing cost increases. The table lists the ratio of variable costs to net sales from 1970 to 1980 for the three major domestic manufacturers and the sales levels associated with those ratios. Over this 11-year period there was a general trend of variable costs to increase faster than sales revenue. In addition, twice during the period, in 1974-1975, and in 1979-1980, demand for new cars dropped significantly and dramatic increases occurred in the variable cost/net sales ratio for those years. These increases imply selling prices for vehicles that do not fully reflect increases in variable manufacturing costs.

Fuel Costs

Changes made in vehicle designs to meet federal safety standards may add additional weight to the regulated vehicles. This additional weight will decrease the efficiency of the vehicle and increase fuel consumption. According to NHTSA studies, the mandated safety standards have added 197 pounds to the average car. The two major segments of this increase are the bumpers and side door guards. General Motors has estimated that lifetime fuel consumption drops one gallon for every one pound reduction in vehicle weight.

Insurance Costs

The cost of owning and operating an automobile is influenced by purchase price, fuel costs, maintenance and repair costs, taxes, and insurance premiums. Although safety regulations may tend to increase the purchase price and fuel consumption of automobiles, they will tend to reduce the cost of automobile insurance premiums. This effect results from a reduction in the frequency and extent of property damage, as well as from a reduction in deaths and injuries, thus reducing medical costs for accident victims.

NHTSA has estimated, for example, that vehicle protection offered by improved bumper systems reduces insurance premiums for collision and liability coverage by $150 to $230 over the lifetime of the vehicle.

A similar reduction occurs in the cost of first party personal injury premiums. The roughly 11,000 fatalities and tens of thousands of injuries

Table 3
Breakdown of New Model Price Increases 1975-1982 Models

	Safety	Emissions	Total Regulatory	Non-Regulatory	Total Increase
1975	$10.70	$119.20	$129.90	256.10	386.00
Percent of Total	2.8	30.9	33.7	66.3	100.0
1976	13.40	7.60	21.00	177.00	198.00
Percent of Total	6.8	3.8	10.6	89.4	100.0
1977	6.95	14.30	21.25	361.05	382.30
Percent of Total	1.8	3.8	5.6	94.4	100.0
1978	0	9.99	9.99	414.50	424.49
Percent of Total	0	2.4	2.4	97.6	100.0
1979	5.75	12.10	17.85	282.45	300.30
Percent of Total	1.9	4.0	5.9	94.1	100.0
1980	13.29	118.04	131.33	234.52	365.85
Percent of Total	3.6	32.3	35.9	64.1	100.0
1981	4.29	155.55*	159.84	376.30	536.14
Percent of Total	0.8	29.0	29.8	70.2	100.0
1982	$ 0	5.00**	5.00	557.54	562.54
Percent of Total	0	0.9	0.9	99.1	100.0
1975-1982 Total	$54.38	$441.78	$496.16	2659.46	3155.62
Percent of Total	1.7	14.0	15.7	84.3	100.0

Source: Bureau of Labor Statistics

* On 1981 models, manufacturers installed on-board computers to supply pollution, fuel economy, and diagnostic control to their vehicles. The total BLS quality adjustment for this feature and a few minor changes to catalytic converters was 466.65. This study assumes that one-third of this cost is attributable to emission controls.

**On 1982 models, BLS combined quality adjustments for fuel economy and emissions to protect the confidentiality of data submitted to them in one model that had an emission change. $5.00 is NHTSA's estimate of the weighted value of the minor change made on the single vehicle in the BLS sample with emission changes.

that are avoided annually because of improved vehicle safety features represent reduced medical, funeral and rehabilitation expenses which could otherwise be paid by insurance companies and passed on to consumers through higher premiums.

A very rough estimate of the value of these premiums can be computed using data supplied by the insurance industry. National Mutual Insurance Companies have estimated that a mandatory passive restraint standard would result in a 24.6 percent reduction in first and third party personal injury premiums. This estimate assumed that compliance with such a standard would result in the installation of devices that would be estimated to be between 40 and 66 percent effective in reducing various injuries.

Total first and third party personal injury premiums in 1979 were $17.3 billion. Estimated 1981 premiums are $20 billion annually with savings due to existing safety standards about $3 billion annually, or $25 per car.

Net Cost of Safety Standards

Any assessment of the effects of safety standards must balance the cost of the standards against the benefits they produce. Although the major focus of this report by NHTSA is costs, in order to maintain this perspective it is appropriate to briefly examine the beneficial effects of safety standards as well.

NHTSA is required by Executive Order 12291 to initiate reviews of currently existing regulations. So far, reviews have been completed for four separate standards: FMVSS 214, side-door strength, part 581, the bumper standard, FMVSS 202, head restraints, and FMVSS's 203 and 204 covering driver impact protection from the steering column. The results of these reviews show that:

1) Standard 214 appears to provide effective occupant protection because it greatly reduces the likelihood of deaths or severe injury in single vehicle side-door impact crashes. The standard costs about $265,000 (1981 dollars) for every fatality that it eliminates.

2) It is not certain whether front bumper systems are cost effective. Rear bumper systems are not, and have never been cost effective since the promulgation of the standard in 1973.

3) Head restraints have significantly reduced whiplash injuries in rear impact crashes. On average, the restraints used in the 1979 model mix result in a cost of $5,000 per injury avoided.

4) The equipment installed in response to Standards 203 and 204 reduced the overall risk of driver fatality in a frontal crash by 12 percent. The standard costs $52,000 (1981 dollars) for every fatality that it eliminates. ■

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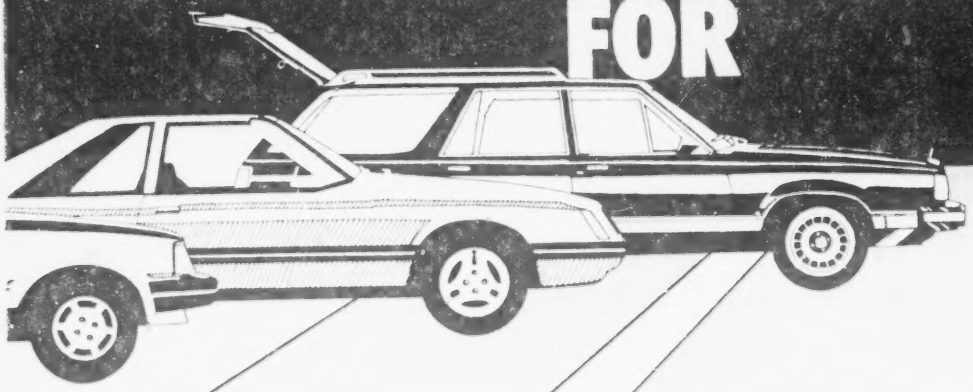

The Final Decision Is Yours

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news highlights

Start Your Educational Year by Attending One of NAFA's Regional Seminars this Fall

"Knowledge is power. Power to become more efficient, more effective and power to become the real professional." NAFA's Founding Member and Past President Walter Langseder, manager/corporate fleet, Thomas J. Lipton, puts the issue of professionalism in these clear cut words.

Education can provide you with the knowledge to assure your future in fleet management. The time to continue learning is now. Management won't wait for you! The best way to kick off your educational year is by attending one of the four regional seminars being offered by NAFA this fall. NAFA's Educational Committee Chairman Peter Greohrs comments: "The regional seminar series is one of NAFA's most important programs to further your growth and professionalism in fleet management."

The subjects to be covered in each seminar are: Life Cycle Costing, Fleet Management & Communications, Preventive Maintenance — Today and Tomorrow, and Effective Communications. These topics, presented by experts in the field, will give you the knowledge and the power to be a "real professional."

Life Cycle Costing

Life cycle cost analysis is a method by which all costs associated with owning and operating a fleet vehicle — purchase price, fuel, maintenance and repair, insurance, parking, tolls — can be reduced to a single figure. This figure can then be compared against several vehicle choices to determine which has the lowest life cycle cost. It requires careful, accurate and detailed record keeping. Thomas J. Timbario of Mueller Associates, Inc., a consulting engineering firm, will give this presentation at the Montreal, Philadelphia and Nashville seminars. Terry R. Flesia, manager, Auto & Truck Fleet, Ingersoll-Rand Co., and author of the book "Successful Business Car Management" will handle this subject at the San Francisco meeting. Both speakers will show you how you can achieve a valid measurement of all your vehicle expenses.

Seminar Subjects

Life Cycle Costing
Fleet Management & Communications
Preventive Maintenance—Today and Tomorrow
Effective Communications

Management and Communications

The first course for the Wharton Certified Fleet Management Program is entitled "Fleet Management and Communications." The topics included in this course are: evolution of management theory; strategic planning; aids for planning and problem solving; authority, delegation, and decentralization; managing organiza-

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FHWA Reports on Operating Expenses:

Compacts Cost 3¢ a Mile Less than Large Cars

Operating expenses — fuel, oil, repairs and maintenance, and tire replacement — for a 1981 model-year compact car, driven 40,700 miles, would be .0828 cents per mile, according to the most recent report from the Federal Highway Administration.

In contrast, the operating expenses for a large (formerly called standard-size) car would be .1119 cents a mile. For an intermediate car the expenses would be .1028 cents a mile, while for a sub-compact, the operation expenses would amount to .0625 cents a mile.

These figures were extracted from the "Cost of Owning and Operating Automobiles and Vans 1982," published by the Office of Highway Planning, Highway Statistics Division, Federal Highway Administration.

The government study is based on an anticipated car life of 12 years and 120,000 miles of driving, with the number of miles driven declining each year. The government's starting point is 14,500 miles for the first year, 13,700 miles during the second year, and 12,500 miles in the third year.

Five American made vehicles were used in the study: a large four-door sedan; an intermediate four-door sedan; a compact car; a sub-compact car, and a 12-passenger van.

The large car, weighing more than 3,500 pounds, is equipped with a V-8 engine, automatic transmission, power steering and brakes, and air conditioning, costs $9,232.

The intermediate car, weighing between 3,000 and 3,500 pounds, is equipped with a 6-cylinder engine, automatic transmission, power steering and brakes, and air conditioning, and costs $7,449.

The compact car weighs between 2,500 and 3,000 pounds and is powered by a 4-cylinder engine equipped with automatic transmission, power brakes, and air conditioning. It costs $7,111.

The sub-compact vehicle is a five-door hatchback weighing less than 2,500 pounds. It is equipped with a 4-cylinder engine, and standard equipment. Its cost is $5,625.

The federal report, intended for the general public, carefully makes a point that every fleet administrator lives with every day: "Most owners think of costs only in terms of outlays for gasoline, oil, tires, and tolls. A more careful examination shows that some costs occur whether or not the vehicle is driven, while others are directly related to the amount of travel. The travel-related group is generally referred to as operating costs and the other group as ownership costs.

Ownership Costs

Ownership costs include depreciation, insurance, registration and titling fees, scheduled maintenance and any taxes applied to these items. No matter how infrequently a vehicle is driven, some portion of these items is incurred.

"Depreciation is the loss in value of the vehicle during its lifetime due to passage of time, its mechanical and physical condition, and the number of miles it is driven . . .

"Depreciation is the single greatest cost of owning and operating most passenger vehicles during a 12-year life span. The cost of gasoline, however, is overtaking depreciation and exceeds depreciation cost for the intermediate-size vehicle studied. In the majority of cases, the age of the vehicle is the most important factor in determining resale or trade-in value. Such factors as mileage, brand popularity, body style, size and color are also considered."

Operating costs, according to the report, "include repairs and maintenance, gasoline, oil, tires, parking, tolls, and the taxes applied to these items."

The operating expenses computed by the Federal Highway Administration are based on these projected miles per gallon fuel efficiencies: large

cars — 17; intermediate cars — 19; compact cars — 24; subcompact — 28; and van — 14 miles per gallon.

A major difference between the two studies is the estimated miles per gallon for each category. The NAFA figures were: large cars — 13.8; intermediate — 17.3; compacts — 18.6; and sub-compacts — 22 9.

It is interesting to note that by projecting the government's estimated operating expenses for a three-year period, or driving 40,700 miles, brings them very close to the operating expenses reported by NAFA members in the 1981 operating expense study conducted by the Association:

Operating Expenses

Car Size	NAFA	FHWA
Large Car	.1213	.1119
Intermediate	.0973	.1028
Compact	.0911	.0828
Sub-Compact	.0818	.0625

One section of the report deals with reimbursement for business use of a personally owned car. It states: "Employers commonly reimburse the costs for the use of an employee's personal car for business purposes. If a personally owned automobile is used only occasionally for business purposes, an amount necessary to cover out-of-pocket costs, tire wear, and general wear on the vehicle is usually considered sufficient.

"If the extent or type of use affects the insurance rate, or if it subjects the automobile to unusual loads and operating conditions, the reimbursements should be adjusted upward accordingly. Tolls and parking costs incurred in the course of such use should be paid separately and in full, regardless of per-mile reimbursement. If an employee's job is dependent on obtaining and using a personal vehicle on the employer's behalf, reimbursement on the basis of the employee's overall costs seems appropriate."

Table 1
Estimated Cost of Owning and Operating
A Large-Size 1981 Model Automobile
(Total Costs in Dollars, Costs Per Mile in Cents)

Item	First Year (14,500 Miles)		Second Year (13,700 Miles)		Third Year (12,500 Miles)	
	Total Cost	Cost Per Mile	Total Cost	Cost Per Mile	Total Cost	Cost Per Mile
Cost Excluding Taxes:						
Depreciation	2,457.00	16.94	1,421.00	10.37	1,200.00	9.60
Scheduled Maintenance	(98.85)	(.68)	(194.95)	(1.42)	(287.46)	(2.30)
Nonscheduled Repairs and Maintenance	(66.75)	(.46)	(117.55)	(.86)	(430.44)	(3.44)
Total Repairs and Maintenance	165.60	1.14	312.50	2.28	717.90	5.74
Replacement Tires	21.01	.14	19.80	.14	29.34	.23
Accessories	11.89	.08	11.37	.08	10.65	.09
Gasoline	1,039.69	7.17	982.39	7.17	896.33	7.17
Oil	11.25	.08	20.25	.15	20.25	.16
Insurance	461.00	3.18	445.00	3.25	445.00	3.56
Parking and Tolls	113.68	.78	107.10	.78	97.71	.78
Total	4,281.12	29.51	3,319.41	24.22	3,417.18	27.33
Taxes and Fees:						
State:						
Gasoline	76.76	.53	72.53	.53	66.18	.53
Registration	20.00	.14	20.00	.15	20.00	.16
Titling	461.60	3.18	—	—	—	—
Operating Cost Sales Tax 2/	(.09)	—	(.72)	(.01)	(10.33)	(.08)
Nonoperating Cost Sales Tax	(.90)	(.01)	(2.29)	(.02)	(2.78)	(.02)
Total Sales Tax	.99	.01	3.01	.03	13.11	.10
Subtotal	559.35	3.86	95.54	.71	99.29	.79
Federal:						
Gasoline	34.12	.24	32.24	.24	29.41	.24
Oil 2/	.08	—	.14	—	.14	—
Tires	4.83	.03	4.57	.03	4.13	.03
Subtotal	39.03	.27	36.95	.27	33.68	.27
Total Taxes	598.38	4.13	132.49	.98	132.97	1.06
Operating Costs	3,511.24	24.21	2,094.61	15.29	1,965.89	15.72
Ownership Costs	1,368.26	9.43	1,357.29	9.91	1,584.26	12.67
Total of All Costs	4,879.50	33.64	3,451.90	25.20	3,550.15	28.39

2/ Where costs per mile are less than .005 cents, a dash (—) appears in the column.

Table 2
Estimated Cost of Owning and Operating
An Intermediate-Size 1981 Model Automobile
(Total Costs in Dollars, Costs Per Mile in Cents)

Item	First Year (14,500 Miles)		Second Year (13,700 Miles)		Third Year (12,500 Miles)	
	Total Cost	Cost Per Mile	Total Cost	Cost Per Mile	Total Cost	Cost Per Mile
Cost Excluding Taxes:						
Depreciation	1,849.00	12.75	1,050.00	7.66	915.00	7.32
Scheduled Maintenance	(102.85)	(.71)	(193.20)	(1.41)	(286.58)	(2.29)
Nonscheduled Repairs and Maintenance	(66.75)	(.46)	(115.55)	(.84)	(438.69)	(3.51)
Total Repairs and Maintenance	169.60	1.17	308.75	2.25	725.27	5.80
Replacement Tires	14.02	.10	13.21	.10	12.05	.10
Accessories	12.11	.08	11.59	.08	10.84	.09
Gasoline	930.34	6.42	879.02	6.42	801.98	6.42
Oil	11.25	.08	20.25	.15	20.25	.16
Insurance	461.00	3.18	445.00	3.25	445.00	3.56
Parking and Tolls	113.68	.78	107.10	.78	97.71	.78
Total	3,561.00	24.56	2,834.92	20.69	3,028.10	24.23
Taxes and Fees:						
State:						
Gasoline	68.69	.47	64.90	.47	59.21	.47
Registration	20.00	.14	20.00	.15	20.00	.16
Titling	372.45	2.57	—	—	—	—
Operating Cost Sales Tax 2/	(.09)	—	(.72)	(.01)	(10.75)	(.09)
Nonoperating Cost Sales Tax	(.92)	(.01)	(2.01)	(.01)	(2.55)	(.02)
Total Sales Tax	1.01	.01	2.73	.02	13.30	.11
Subtotal	462.15	3.19	87.63	.64	92.51	.74
Federal:						
Gasoline	30.53	.21	28.84	.21	26.32	.21
Oil 2/	.08	—	.14	—	.14	—
Tires	3.25	.02	3.06	.02	2.81	.02
Subtotal	33.86	.23	32.04	.23	29.27	.23
Total Taxes	496.01	3.42	119.67	.87	121.78	.97
Operating Costs	1,238.68	8.54	1,232.79	9.00	1,469.91	11.76
Ownership Costs	2,818.33	19.44	1,721.80	12.56	1,679.97	13.44
Total of All Costs	4,057.01	27.98	2,954.59	21.56	3,149.88	25.20

Table 3
Estimated Cost of Owning and Operating A Compact-Size 1981 Model Automobile (Total Costs in Dollars, Costs Per Mile in Cents)

Item	First Year (14,500 Miles)		Second Year (13,700 Miles)		Third Year (12,500 Miles)	
	Total Cost	Cost Per Mile	Total Cost	Cost Per Mile	Total Cost	Cost Per Mile
Cost Excluding Taxes						
Depreciation	1,206.00	8.32	984.00	7.18	730.00	5.84
Scheduled Maintenance	(66.10)	(.46)	(172.90)	(1.26)	(208.60)	(1.67)
Nonscheduled Repairs and Maintenance	(67.00)	(.46)	(117.80)	(.86)	(360.87)	(2.89)
Total Repairs and Maintenance	133.10	.92	289.90	2.12	569.47	4.56
Replacement Tires	13.85	.10	13.05	.10	11.91	.10
Accessories	14.44	.10	13.78	.10	12.84	.10
Gasoline	736.52	5.08	695.81	5.08	634.86	5.08
Oil	11.25	.08	20.25	.15	20.25	.16
Insurance	461.00	3.18	445.00	3.25	445.00	3.56
Parking and Tolls	113.68	.78	107.10	.78	97.71	.78
Total	2,689.84	18.56	2,568.89	18.76	2,522.04	20.18
Taxes and Fees						
State						
Gasoline	54.38	.38	51.37	.37	46.87	.37
Registration	20.00	.14	20.00	.15	20.00	.16
Titling	355.55	2.45	—	—	—	—
Operating Cost Sales Tax 2/	(.10)	—	(.73)	(.01)	(6.25)	(.05)
Nonoperating Cost Sales Tax	(1.00)	(.01)	(1.27)	(.01)	(2.32)	(.02)
Total Sales Tax	1.10	.01	2.00	.02	8.57	.07
Subtotal	431.03	2.98	73.37	.54	75.44	.60
Federal						
Gasoline	24.12	.17	22.83	.17	20.83	.17
Oil 2/	.08	—	.14	—	.14	—
Tires	2.99	.02	2.83	.02	2.57	.02
Subtotal	27.24	.19	25.80	.19	23.54	.19
Total Taxes	458.27	3.17	99.17	.73	98.98	.79
Operating Costs	1,024.02	7.07	1,031.91	7.54	1,202.26	9.62
Ownership Costs	2,124.09	14.66	1,636.15	11.95	1,418.76	11.35
Total of All Costs	3,148.11	21.73	2,668.06	19.49	2,621.02	20.97

"Most owners think of costs only in terms of outlays for gasoline, oil, tires, and tolls. A more careful examination shows that some costs occur whether or not the vehicle is driven, while others are directly related to the amount of travel."

Table 4
Estimated Cost of Owning and Operating A Subcompact-Size 1981 Model Automobile (Total Costs in Dollars, Costs Per Mile in Cents)

Item	First Year (14,500 Miles)		Second Year (13,700 Miles)		Third Year (12,500 Miles)	
	Total Cost	Cost Per Mile	Total Cost	Cost Per Mile	Total Cost	Cost Per Mile
Cost Excluding Taxes						
Depreciation	956.00	6.59	776.00	5.66	580.00	4.64
Scheduled Maintenance	(96.85)	(.67)	(177.85)	(1.30)	(205.53)	(1.64)
Nonscheduled Repairs and Maintenance	(67.00)	(.46)	(113.80)	(.83)	(304.98)	(2.44)
Total Repairs and Maintenance	163.85	1.13	291.65	2.13	510.51	4.08
Replacement Tires	12.40	.09	11.68	.09	10.65	.09
Accessories	14.96	.10	14.27	.10	13.29	.11
Gasoline	631.32	4.35	596.46	4.35	544.16	4.35
Oil	9.00	.06	18.00	.13	18.00	.14
Insurance	415.00	2.86	401.00	2.93	401.00	3.21
Parking and Tolls	113.68	.78	107.10	.78	97.71	.78
Total	2,316.21	15.96	2,216.16	16.17	2,175.32	17.40
Taxes and Fees						
State						
Gasoline	46.61	.32	44.04	.32	40.18	.32
Registration	20.00	.14	20.00	.15	20.00	.16
Titling	281.25	1.94	—	—	—	—
Operating Cost Sales Tax 2/	(.10)	—	(.53)	—	(6.98)	(.06)
Nonoperating Cost Sales Tax	(1.06)	(.01)	(1.67)	(.01)	(1.66)	(.01)
Total Sales Tax	1.16	.01	2.20	.01	8.64	.07
Subtotal	349.02	2.41	66.24	.48	68.82	.55
Federal						
Gasoline	20.72	.14	19.57	.14	17.86	.14
Oil 2/	.06	—	.12	—	.12	—
Tires	2.33	.02	2.20	.02	2.00	.02
Subtotal	23.11	.16	21.89	.16	19.98	.16
Total Taxes	372.13	2.57	88.13	.64	88.80	.71
Operating Costs	933.22	6.22	913.50	6.66	1,042.64	8.34
Ownership Costs	1,785.12	12.31	1,390.79	10.15	1,221.48	9.77
Total of All Costs	2,688.34	18.53	2,304.29	16.81	2,264.12	18.11

"Depreciation is the single greatest cost of owning and operating most passenger vehicles during a 12-year life span. The cost of gasoline, however, is overtaking depreciation and exceeds depreciation cost for the intermediate-size vehicle studied."

Table 5
Estimated Cost of Owning and Operating
A 1981 Model Passenger Van
(Total Costs in Dollars, Costs Per Mile in Cents)

Item	First Year (14,500 Miles)		Second Year (13,700 Miles)		Third Year (12,500 Miles)	
	Total Cost	Cost Per Mile	Total Cost	Cost Per Mile	Total Cost	Cost Per Mile
Cost Excluding Taxes						
Depreciation	3,983.00	27.47	1,846.00	13.47	1,361.00	10.89
Scheduled Maintenance	(96.85)	(.67)	(177.85)	(1.30)	(205.53)	(1.64)
Nonscheduled Repairs and Maintenance	(67.50)	(.47)	(161.53)	(1.18)	(626.81)	(5.01)
Total Repairs and Maintenance	164.35	1.14	339.38	2.48	832.34	6.65
Replacement Tires	15.12	.10	14.24	.10	59.72	.48
Accessories	18.09	.12	17.28	.13	16.13	.13
Gasoline	1,262.52	8.71	1,192.91	8.71	1,088.45	8.71
Oil	13.50	.09	24.75	.18	24.75	.20
Insurance	585.00	4.03	567.00	4.14	567.00	4.54
Parking and Tolls	113.68	.78	107.10	.78	97.71	.78
Total	6,155.26	42.44	4,108.66	29.99	4,047.10	32.38
Taxes and Fees						
State						
Gasoline	93.21	.64	88.07	.64	80.36	.64
Registration	30.00	.21	30.00	.22	30.00	.24
Titling	643.85	4.44	—	—	—	—
Operating Cost Sales Tax 2/	(.13)	—	(1.65)	(.01)	(16.69)	(.13)
Nonoperating Cost Sales Tax	(1.21)	(.01)	(1.82)	(.01)	(1.81)	(.01)
Total Sales Tax	1.34	.01	3.47	.02	18.50	.14
Subtotal	768.40	5.30	121.54	.88	128.86	1.02
Federal						
Gasoline	41.43	.29	39.14	.29	35.72	.29
Oil 2/	.09	—	.17	—	.17	—
Tires	6.53	.05	6.18	.05	5.63	.05
Subtotal	48.05	.34	45.49	.34	41.52	.34
Total Taxes	816.45	5.64	167.03	1.22	170.38	1.36
Operating Costs	1,613.71	11.13	1,635.74	11.94	2,036.01	16.29
Ownership Costs	5,358.00	36.95	2,639.95	19.27	2,181.47	17.45
Total of All Costs	6,971.71	48.08	4,275.69	31.21	4,217.48	33.74

"Employers commonly reimburse the costs for the use of an employee's personal car for business purposes. If a personally owned automobile is used only occasionally for business purposes, an amount necessary to cover out-of-pocket costs, tire wear, and general wear on the vehicle is usually considered sufficient."

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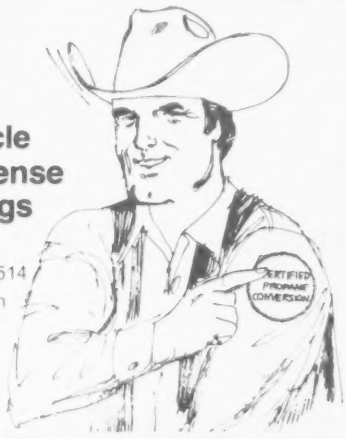

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Leasing Co. Recommendations

(Continued from page 14)

Large Cars

As we move into the mid-eighties, the very words "large cars" begin to take on a new meaning. Last year's mid-size becomes next year's full-size. We recognize that there will always be usage considerations that justify a truly large car. These considerations boil down to rugged use and sheer volume requirements.

At one time, the additional up-front cost associated with diesel engines in this size car was offset by lower fuel costs and no resale penalty. Now that the fuel situation has changed, there is a resale penalty being assessed on full-size diesels versus full-size, gas-powered cars. Therefore, we are not recommending the diesel versions of these cars for 1983.

If you must order larger cars, PH&H recommends the following:

Buick LeSabre Custom	4-door	231 V-6 Gas
Chevrolet Impala	4-door	231 V-6 Gas
Oldsmobile Delta '88	4-door	231 V-6 Gas

USFL Recommendations

United States Fleet Leasing recommends mid-size sedans for most business fleets. They are simultaneously roomy and economical, and offer relatively low

(Continued on page 36)

NAFA
Bulletin
The Magazine for Fleet Administrators
October 1982

A6755-1

1983 EPA Estimated Gas Mileage Figures

BEST AVAILABLE COPY

news highlights

New NAFA Program Focusses on the Hows and Whys of Today's Automobiles

For the first time in its history, NAFA is launching two 4½ day intensive, thorough courses on the operation of key automobile components systems. These technically substantial programs are scheduled to take place on November 1-5 in New Jersey and November 29 through December 3 in Texas. The program was developed by NAFA's Maintenance Committee Chairman Pat Mourges and NAFA's Technical Consultant Joe Alacchi in cooperation with NAFA's Educational Committee Chairman Peter Greohrs.

According to Mourges, the purpose of the course is to help provide fleet managers with the much-needed understanding of the ways in which the various components of today's complex automobile work. The program will provide a practical guide to the minor maintenance and periodic inspections of the key components that will insure the performance of the vehicles entrusted to the fleet manager.

The instructor for the course is Joe Alacchi. He will combine lectures, demonstrations, and audio-visual learning aids to achieve a comprehensive understanding of basic principles in motor vehicle operations. "All lecturers will be reinforced by direct hands-on experience, using the latest equipment and techniques," claims Alacchi. He will focus on:

- **What it is**
- **Why its there**
- **How it works, and**
- **How to keep it working**

In order to insure each student with the benefits of concentrated instruction and individual participation, enrollment in each class is limited to 15. The fee for the workshops in New Jersey and Texas is, respectively, $495 and $445. (For Texas, the fee is lower because the cost of meals is included in the room rate.) In addition to breakfast and lunch for each day, the fee includes a comprehensive workbook, extensive handouts, and a textbook on automobile operations and maintenance. At the end of the course, you will receive a handsome certificate showing that you have successfully completed the nine-session course.

This new program will be offered in these two cities:

November 1-5
Sheraton Newark Airport
Elizabeth, New Jersey

November 29-December 3
American Airlines Learning Center
Fort Worth, Texas

Don't miss this opportunity to fill in your gaps in technical know-how. In one week, this course will provide you with the knowledge that could take other fleet managers years to acquire.

For further information, write to NAFA 295 Madison Ave., New York, NY 10017 or call (212) 689-3200.

NAFA © Bulletin

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EPA's 1983 Estimated Gas Mileage Figures

The following mileage ratings, provided by the Environmental Protection Agency, include all vehicles sold in the United States except California.

The mileage ratings represent city driving figures. The Agency cautions that the number should be used for comparison only since a driver's actual mileage could vary widely from the estimate.

In certain cases, apparently identical listings will show different mileage ratings. This occurs because of some factor that is not shown on this table, such as different types of carburetors. The "D" under the transmission column represents diesel engines.

EPA Car Categories

Mini-Compact — Less than 85 cubic feet of passenger and luggage volume.

Sub-Compact — Between 85 to 100 cubic feet of passenger and luggage volume.

Compact — Between 100 to 110 cubic feet of passenger and luggage volume.

Mid-Size — Between 110 to 120 cubic feet of passenger and luggage volume.

Large — More than 120 cubic feet of passenger and luggage volume.

MPG	Make	Transmission	CID	Cyl.
	Two-Seaters			
23	Alfa R Spdr 2000 Vel	M5	120	4
21	Datsun 280ZX	M5	168	6
19	Datsun 280ZX	M5	168	6
19	Datsun 280ZX	A3	168	6
11	Ferrari 308	M5	179	8
25	Fiat Spdr 2000	M5	122	4
22	Fiat Spdr 2000	A3	122	4
26	Fiat X1-9	M5	91	4
29	Ford EXP	M4	98	4
27	Ford EXP	A3	98	4
29	Linc-Merc LN-7	M4	98	4
27	Linc-Merc LN-7	A3	98	4
20	Mazda RX-7 (Rotary)	M5	70	2
19	Mazda RX-7 (Rotary)	A3	70	2
18	Mercedes Benz 380SL	A4	234	8
	Mini-Compact Cars			
22	Alfa R GTV	M5	152	6
11	Ferrari Mondial	M5	179	8
39	Honda Civic	M4	81	4
46	Honda Civic	M5	81	4
35	Honda Civic	M5	91	4
31	Honda Civic	A3	91	4
16	Porsche 911	M5	183	6
22	Porsche 944	M5	151	4
21	Porsche 944	A3	151	4
33	Renault LeCar	M4	85	4
42	Toyota Starlet	M4	79	4
44	Toyota Starlet	M5	79	4
29	VW Rabbit Cnv	M5	105	4
25	VW Rabbit Cnv	A3	105	4
	Sub-Compact Cars			
21	AMC Spirit	M4	258	6
21	AMC Spirit	M5	258	6
21	AMC Spirit	A3	258	6
17	Audi Quattro	M5	131	5
39	Audi 4000 Coupe	D-M5	97	4
38	Audi 4000 Coupe	D-M5	97	4
34	Audi 4000 Coupe	D-A3	97	4
31	Audi 4000 Coupe	M5	105	4
24	Audi 4000 Coupe	A3	105	4
24	Audi 4000 Coupe	M5	131	5
20	Audi 4000 Coupe	A3	131	5
25	BMW 320i	M5	108	4
27	BMW 320i	A3	108	4
19	BMW 633CSI	M5	196	6
18	BMW 633CSI	A3	196	6
24	Chevy Camaro	M5	151	4
26	Chevy Camaro	M5	151	4
23	Chevy Camaro	A3	151	4
16	Chevy Camaro	A4	305	8
31	Chevy Chevette	M5	98	4
28	Chevy Chevette	A3	98	4
42	Chevy Chevette	D-M5	111	4
37	Chevy Chevette	D-A3	111	4
27	Chrysler Lebaron Cnv	A3	135	4
22	Chrysler Lebaron Cnv	A3	156	4
40	Datsun Nissan Sentra	M4	91	4
35	Datsun Nissan Sentra	M4	98	4
35	Datsun Nissan Sentra	M5	98	4
31	Datsun Nissan Sentra	A3	98	4
48	Dats Nissan Sentra	D-M4	103	4
44	Dats Nissan Sentra	D-M5	103	4
40	Dats Nissan Sentra	D-A3	103	4
35	Datsun Pulsar	M5	98	4
31	Datsun Pulsar	A3	98	4
27	Datsun 200SX	M5	133	4
25	Datsun 200SX	A3	133	4
20	Datsun 280ZX2x2	M5	168	6
19	Datsun 280ZX2x2	M5	168	6
19	Datsun 280ZX2x2	A3	168	6
18	Datsun 280ZX2x2	A3	168	6
23	Datsun 810	M5	146	6
23	Datsun 810	A4	146	6
30	Datsun 810	D-M5	170	6
28	Datsun 810	D-A4	170	6
24	Dodge Challenger	M5	156	4
23	Dodge Challenger	A3	156	4
34	Dodge Charger	M4	97	4
32	Dodge Charger	M4	105	4
29	Dodge Charger	M4	135	4
28	Dodge Charger	M5	135	4
27	Dodge Charger	A3	135	4
39	Dodge Colt	M4	86	4
35	Dodge Colt	M4	86	4
32	Dodge Colt	M4	98	4
30	Dodge Colt	A3	98	4
27	Dodge 400 Cnv	A3	135	4
22	Dodge 400 Cnv	A3	156	4
26	Ford Mustang	M4	140	4
22	Ford Mustang	M5	140	4
21	Ford Mustang	A3	140	4
20	Ford Mustang	A3	231	6
32	Honda Accord	M5	107	4
29	Honda Accord	A4	107	4
26	Isuzu I-Mark	A3	111	4
44	Isuzu I-Mark	D-M4	111	4
39	Isuzu I-Mark	D-M5	111	4

MPG	Make	Trans-mission	CID	Cyl.
34	Isuzu I-Mark	D-A3	111	4
17	Jaguar XJ	A3	258	6
14	Jaguar XJS	A3	326	12
26	Lincoln Mercury Capri	M4	140	4
22	Lincoln Mercury Capri	M5	140	4
21	Lincoln Mercury Capri	A3	140	4
20	Lincoln Mercury Capri	A3	231	6
34	Mazda GLC	M4	91	4
36	Mazda GLC	M5	91	4
31	Mazda GLC	A3	91	4
28	Mazda 626	M5	122	4
27	Mazda 626	A3	122	4
33	Mitsubishi Cordia	M5	110	4
27	Mitsubishi Cordia	A3	110	4
27	Mitsubishi Cordia	M4	110	4
39	Mitsubishi Precis	M4	86	4
35	Mitsubishi Precis	M4	86	4
32	Mitsubishi Precis	M4	98	4
30	Mitsubishi Precis	A3	98	4
24	Mitsubishi Sapporo	M5	156	4
23	Mitsubishi Sapporo	A3	156	4
22	Mitsubishi Starion	M5	156	4
33	Mitsubishi Tredia	M5	110	4
27	Mitsubishi Tredia	M4	110	4
27	Mitsubishi Tredia	A3	110	4
39	Plymouth Colt	M4	86	4
35	Plymouth Colt	M4	86	4
32	Plymouth Colt	M4	98	4
30	Plymouth Colt	A3	98	4
24	Plymouth Sapporo	M5	156	4
23	Plymouth Sapporo	A3	156	4
34	Plymouth Turismo	M4	97	4
32	Plymouth Turismo	M4	105	4
29	Plymouth Turismo	M4	135	4
28	Plymouth Turismo	M5	135	4
28	Plymouth Turismo	A3	135	4
24	Pontiac Firebird	M5	151	4
26	Pontiac Firebird	M5	151	4
23	Pontiac Firebird	A3	151	4
16	Pontiac Firebird	A4	305	8
31	Pontiac 1000	M5	98	4
28	Pontiac 1000	A3	98	4
42	Pontiac 1000	D-M5	111	4
37	Pontiac 1000	D-A3	111	4
26	Renault Fuego	M5	95	4
27	Renault Fuego	M5	100	4
24	Renault Fuego	A3	100	4
27	Renault 18i Sedan	M5	100	4
24	Renault 18i Sedan	A3	100	4
9	Rolls Royce Corniche	A3	412	8
32	Subaru	M4	97	4
32	Subaru	M5	97	4
31	Subaru	M5	109	4
27	Subaru	A3	109	4
25	Toyota Celica	M5	144	4
26	Toyota Celica	M5	144	4
26	Toyota Celica	A4	144	4
21	Toyota Celica Supra	M5	168	6
22	Toyota Celica Supra	A4	168	6
36	Toyota Corolla	M4	97	4
33	Toyota Corolla	M5	97	4
31	Toyota Corolla	A3	97	4
32	Toyota Corolla	A4	97	4
39	Toyota Tercel	M4	89	4
34	Toyota Tercel	M5	89	4
32	Toyota Tercel	A3	89	4
21	Toyota Cressida	M5	168	6
22	Toyota Cressida	A4	168	6
42	Volkswagen Jetta	D-M5	97	4
37	Volkswagen Jetta	D-A3	97	4
30	Volkswagen Jetta	M5	105	4
43	VW Jetta Turbo	D-M5	97	4
25	Volkswagen Jetta	A3	105	4
36	VW Jetta Turbo	D-A3	97	4

Actual Real World Mileage

The range of gas mileage is:

	Model Year 1981	Model Year 1982
4 cyl.	18.94-26.18	20.09-28.61
6 cyl.	18.05-22.26	17.60-23.11
8 cyl.	*	*

Source: Peterson, Howell & Heather, Inc.

* Because of the shift to 4- and 6-cylinder engine vehicles, there are not enough data for reliable figures for the 8-cylinder engines

MPG	Make	Trans-mission	CID	Cyl.
48	Volkswagen Rabbit	D-M4	97	4
43	Volkswagen Rabbit	D-M5	97	4
35	Volkswagen Rabbit	D-A3	97	4
32	Volkswagen Rabbit	M4	105	4
31	Volkswagen Rabbit	M4	105	4
30	Volkswagen Rabbit	M5	105	4
27	Volkswagen Rabbit	A3	105	4
50	VW Rabbit (Semi)	A	97	4
43	VW Rabbit (Turbo)	M5	97	4
26	Volkswagen Rabbit	M5	100	4
36	VW Rabbit (Turbo)	D-A3	97	4
29	Volkswagen Scirocco	M5	105	4
25	Volkswagen Scirocco	A3	105	4
	Compact Cars			
21	AMC Concord	M4	258	6
21	AMC Concord	M5	258	6
21	AMC Concord	A3	258	6
22	Audi 5000	M5	131	5
22	Audi 5000	M5	131	5
18	Audi 5000 Turbo	A3	131	5
19	Audi 5000	A3	131	5
19	Audi 5000	A3	131	5
28	Audi D Turbo	A3	121	5
19	BMW 733I	M5	196	6
18	BMW 733I	A3	196	6
22	BMW 533I	M5	164	6
20	BMW 533I	A3	164	4
19	BMW 533I	M5	196	6
18	BMW 533I	A3	196	6
17	Buick Riviera Conv	A4	252	6
16	Buick Riviera Conv	A4	307	8
28	Buick Skyhawk	M5	110	4
28	Buick Skyhawk	A3	110	4
25	Buick Skyhawk	A3	121	4
27	Buick Skylark	M4	151	4
24	Buick Skylark	A3	151	4
22	Buick Skylark	A3	173	6
22	Buick Skylark	M4	173	6
21	Buick Skylark	M4	173	6
23	Cadillac Cimarron	A3	121	4
23	Cadillac Cimarron	M5	121	4
25	Chevy Cavalier	A3	121	4
25	Chevy Cavalier	M5	121	4
31	Datsun Nissan Stanza	M5	120	4

(Continued on page 10)

MPG	Make	Trans-mission	CID	Cyl.
27	Datsun Nissan Stanza	A3	120	4
32	Dodge Omni	M4	105	4
29	Dodge Omni	M4	135	4
29	Dodge Omni	A3	135	4
34	Dodge Omni	M4	97	4
28	Dodge Omni	M5	135	4
33	Ford Escort	M4	98	4
27	Ford Escort	M3	98	4
21	Thunderbird	A3	231	6
21	Merc Cougar	A3	231	6
33	Linc-Merc Lynx	M4	98	4
27	Linc-Merc Lynx	A3	98	4
28	Mer Benz 240	D-M4	147	4
27	Mer Benz 240	D-A4	147	4
27	Mer Benz 240 (Turbo)	D-A4	183	5
27	Mer Benz 300SD (Turbo)	D-A4	183	5
18	Mer Benz 380SEC	A4	234	8
25	Olds Firenza	A3	121	4
25	Olds Firenza	M5	121	4
27	Olds Omega	M4	151	4
24	Olds Omega	A3	151	4
22	Olds Omega	M4	173	6
21	Olds Omega	M4	173	6
22	Olds Omega	A3	173	6
27	Peugeot 505	D-M4	141	4
28	Peugeot 505 Turbo	D-M5	141	4
26	Peugeot 505	D-A3	141	4
26	Peugeot 505 Turbo	D-A3	141	4
22	Peugeot 505	M5	120	4
21	Peugeot 505	A3	120	4
28	Peugeot 604 Turbo	D-M5	141	4
26	Peugeot 604 Turbo	D-A3	141	4
34	Plymouth Horizon	M4	97	4
32	Plymouth Horizon	M4	105	4
29	Plymouth Horizon	M4	135	4
29	Plymouth Horizon	A3	135	4
28	Plymouth Horizon	M5	135	4
31	Pontiac 2000	M5	110	4
37	Renault Alliance	M4	85	4
34	Renault Alliance	M5	85	4
9	Rolls Royce Camargue	A3	412	8
23	Saab 900	M5	121	4
21	Saab 900 Turbo	M5	121	4
21	Saab 900 Turbo	A3	121	4
22	Saab 900	A3	121	4
29	Volkswagen Quantum	M5	105	4
23	Volkswagen Quantum	A3	105	4
41	VW Quantum (Turbo)	D-M5	97	4
32	VW Quantum (Turbo)	D-A3	97	4
20	Volvo DL-GL-GLT-Turbo	M4	130	4
20	Volvo DL-GL-GLT-Turbo	A4	130	4
25	Volvo DL-GL-GLT-Turbo	M4	141	4
23	Volvo DL-GL-GLT-Turbo	A4	141	4
29	Volvo DL-GL-GLT	D-M4	145	6
27	Volvo DL-GL-GLT	D-A3	145	6

Mid-Size Cars

20	Buick Century	A3	181	6
26	Buick Regal	D-A3	263	6
18	Buick Regal Turbo	A4	231	6
23	Buick Regal	D-A3	350	8
21	Buick Riviera	A3	231	6
21	Buick Riviera	D-A4	350	8
16	Buick Riviera Turbo	A4	231	6
17	Buick Riviera	A4	252	6
16	Buick Riviera	A4	307	8
17	Cadillac Eldorado	A4	249	8
21	Cadillac Eldorado	D-A4	350	8
17	Cadillac Seville	A4	249	8
21	Cadillac Seville	D-A4	350	8
22	Chevy Celebrity	A3	173	6
27	Chevy Celebrity	D-A3	263	6
22	Chevy Citation	A3	173	6
21	Chevy Citation	M4	173	6
20	Chevy Malibu	A3	229	6
25	Chevy Malibu	D-A3	263	6
18	Chevy Malibu	A3	305	8
23	Chevy Malibu	D-A3	350	8
20	Chevy Monte Carlo	A3	229	6
25	Chevy Monte Carlo	D-A3	263	6
18	Chevy Monte Carlo	A3	305	8
23	Chrysler Cordoba	D-A3	350	8
18	Chrysler Cordoba	A3	225	6
17	Chrysler LeBaron	A3	318	8
24	Chrysler New Yorker	A3	135	4
22	Chrysler New Yorker	A3	156	4
18	Chrysler Fifth Ave.	A3	225	6
17	Chrysler Fifth Ave	A3	318	8
28	Chrysler E Class	M5	135	4
27	Chrysler E Class	A3	135	4
22	Chrysler E Class	A3	156	4
29	Dodge Aries	M4	135	4
28	Dodge Aries	A3	135	4
24	Dodge Aries	A3	156	4
28	Dodge Aries	M5	135	4
19	Dodge Diplomat	A3	225	6
17	Dodge Diplomat	A3	318	8
19	Dodge Mirada	A3	225	6
17	Dodge Mirada	A3	318	8
28	Dodge 400	M5	135	4
27	Dodge 400	A3	135	4
22	Dodge 400	A3	156	4
23	Dodge 600	M5	135	4
24	Dodge 600	A3	135	4
22	Dodge 600	A3	156	4
26	Ford Fairmont Futura	M4	140	4
21	Ford Fairmont Futura	A3	140	4
19	Ford Fairmont Futura	A3	200	6
26	Ford LTD	M4	140	4
21	Ford LTD	A3	140	4
20	Ford LTD	A3	200	4
16	Imperial	A3	318	8
17	Linc-Merc Continental	A4	302	8
26	Linc-Merc Marquis	M4	140	4
21	Linc-Merc Marquis	A3	140	4
20	Linc-Merc Marquis	A3	200	6
26	Linc-Merc Zephyr	M4	140	4
21	Linc-Merc Zephyr	A3	140	4
19	Linc-Merc Zephyr	A3	200	6
8	Maserati Quattroporte	A3	301	8
18	Mercedes-Benz 380SEL	A4	234	8
24	Olds Cutlass Ciera	A3	151	4
20	Olds Cutlass Ciera	A3	181	6
28	Olds Cutlass Ciera	D-A3	263	6
21	Olds Cutlass Supreme	A3	231	6
25	Olds Cutlass Supreme	D-A3	263	6
18	Olds Cutlass Supreme	A3	307	8
23	Olds Cutlass Supreme	D-A3	350	8
17	Olds Toronado	A4	252	6
16	Olds Toronado	A4	307	8
22	Olds Toronado	A4	350	8
19	Plymouth Gran Fury	A3	225	6
17	Plymouth Gran Fury	A3	318	8
29	Plymouth Reliant	M4	135	4
28	Plymouth Reliant	M5	135	4
28	Plymouth Reliant	A3	135	4
24	Plymouth Reliant	A3	156	4
21	Pontiac Bonneville	A3	231	6
18	Pontiac Bonneville	A3	305	8
23	Pontiac Bonneville	D-A3	350	8
21	Pontiac Grand Prix	A3	231	6
18	Pontiac Grand Prix	A3	305	8
23	Pontiac Grand Prix	D-A3	350	8
27	Pontiac Phoenix	M4	151	4
24	Pontiac Phoenix	A3	151	4
22	Pontiac Phoenix	M4	173	6

(Continued on page 12)

MPG	Make	Trans-mission	CID	Cyl.
22	Pontiac Phoenix	A3	173	6
24	Pontiac 6000	A3	151	4
25	Pontiac 6000	A3	151	4
22	Pontiac 6000	A3	173	6
28	Pontiac 6000	D-A3	263	6
28	Volvo 760 GLE	D-M4	145	6
27	Volvo 760 GLE	D-A3	145	6
20	Volvo 760 GLE	A4	174	6
	Large Cars			
18	Buick Electra	A4	252	6
16	Buick Electra	A4	307	8
22	Buick Electra	D-A4	350	8
19	Buick LeSabre	A3	231	6
19	Buick LeSabre	A3	231	6
19	Buick LeSabre	A3	231	6
18	Buick LeSabre	A4	252	6
17	Buick LeSabre	A3	307	8
17	Buick LeSabre	A4	307	8
21	Buick LeSabre	D-A3	350	8
22	Buick LeSabre	D-A4	350	8
22	Buick LeSabre	D-A4	350	8
22	Cad. De Ville-Br.	D-A4	350	8
19	Chevy Impala-Caprice	A3	229	6
17	Chevy Impala-Caprice	A4	305	8
23	Chevy Impala-Caprice	D-A3	350	8
22	Chevy Impala-Caprice	D-A4	350	8
17	Linc-Merc Gr Marquis	A4	302	8
17	Linc-Mercury Mark VI	A4	302	8
17	Linc-Mercury Town Car	A4	302	8
19	Oldsmobile Delta 88	A3	231	6
17	Oldsmobile Delta 88	A3	307	8
17	Oldsmobile Delta 88	A4	307	8
22	Olds Delta 88	D-A4	350	8
18	Olds Ninety-Eight	A4	252	6
17	Olds Ninety-Eight	A4	307	8
22	Olds Ninety-Eight	D-A4	350	8
	Small Station Wagons			
21	AMC Concord Wagon	M4	258	6
21	AMC Concord Wagon	M5	258	6
21	AMC Concord Wagon	A3	258	6
28	Buick Skyhawk Wagon	M5	110	4
28	Buick Skyhawk Wagon	A3	110	4
23	Buick Skyhawk Wagon	A3	121	4
25	Chevy Cavalier Wagon	M5	121	4
25	Chevy Cavalier Wagon	A3	121	4
35	Datsun Nissan Sentra	M4	98	4
35	Datsun Nissan Sentra	M5	98	4
31	Datsun Nissan Sentra	A3	98	4
42	Datsun Nissan Sentra	D-M5	103	4
38	Datsun Nissan Sentra	D-A3	103	4
23	Datsun 810 Wagon	M5	146	6
22	Datsun 810 Wagon	A4	146	6
30	Datsun 810 Wagon	D-M5	170	6
28	Datsun 810 Wagon	D-A4	170	6
29	Ford Escort Wagon	M4	98	4
27	Ford Escort Wagon	A3	98	4
35	Honda Civic Wagon	M5	91	4
31	Honda Civic Wagon	A3	91	4
29	Linc-Merc Lynx Wagon	M4	98	4
27	Linc-Merc Lynx Wagon	A3	98	4
30	Mazda GLC Wagon	M4	91	4
30	Mazda GLC Wagon	M5	91	4
26	Mazda GLC Wagon	A3	91	4
28	Olds Firenza Cruiser	M5	110	4
28	Olds Firenza Cruiser	A3	110	4
25	Olds Firenza Cruiser	M5	121	4
23	Olds Firenza Cruiser	A3	121	4
28	Pontiac 2000	M5	110	4
28	Pontiac 2000	A3	110	4
27	Renault 18i Wagon	M5	100	4
24	Renault 18i Wagon	A3	100	4
30	Subaru Wagon	M5	109	4
27	Subaru Wagon	A3	109	4
33	Toyota Corolla Wagon	M5	97	4
31	Toyota Corolla Wagon	A3	97	4
22	Toyota Cressida Wagon	A4	168	6
32	Toyota Tercel Wagon	M5	89	4
41	Volks Quantum Wagon	D-M5	97	4
32	Volks Quantum Wagon	D-A3	97	4
29	Volks Quantum Wagon	M5	105	4
23	Volks Quantum Wagon	A3	105	4
	Mid-Size Station Wagons			
21	Buick Regal Est. Wgn.	A3	231	6
23	Buick Regal Est. Wgn.	D-A3	350	8
20	Chevy Malibu Wgn.	A3	229	6
17	Chevy Malibu Wgn.	A3	305	8
23	Chevy Malibu Wgn.	D-A3	350	8
24	Chry Town & Country	A3	135	4
22	Chry Town & Country	A3	156	4
28	Dodge Aries Wgn.	M4	135	4
28	Dodge Aries Wgn.	M5	135	4
27	Dodge Aries Wgn.	A3	135	4
22	Dodge Aries Wgn.	A3	156	4
20	Ford LTD Wgn.	A3	200	6
20	Linc Merc Marq. Wgn.	A3	200	6
27	Mer-Benz 300 TD	D-A4	183	5
21	Olds Cutl Cruis Wgn.	A3	231	6
17	Olds Cutl Cruis Wgn.	A3	307	8
23	Olds Cutl Cruis Wgn.	D-A3	350	8
27	Peugeot 504 Wgn.	D-M4	141	4
26	Peugeot 504 Wgn.	D-A3	141	4
28	Plymouth Reliant Wgn.	M4	135	4
28	Plymouth Reliant Wgn.	M5	135	4
27	Plymouth Reliant Wgn.	A3	135	4
22	Plymouth Reliant	A3	156	4
21	Pontiac Bonnev Wgn.	A3	231	6
17	Pontiac Bonnev Wgn.	A3	305	8
23	Pontiac Bonnev Wgn.	D-A3	350	8
20	Volvo Wagon	M4	130	4
20	Volvo Wagon Turbo	A4	130	4
24	Volvo Wagon	M4	141	4
23	Volvo Wagon	A4	141	4
29	Volvo Wagon	D-M4	145	6
27	Volvo Wagon	D-A3	145	6
	Large Station Wagons			
16	Buick LeSabre-Electra	A4	307	8
21	Buick LeSabre-Electra	D-A3	350	8
22	Buick LeSabre-Electra	D-A4	350	8
16	Chevy Impala-Caprice	A4	305	8
21	Chevy Impala-Caprice	D-A3	350	8
22	Chevy Impala-Caprice	D-A4	350	8
17	Ford LTD	A4	302	8
17	Lincoln Mercury Marq	A4	302	8
16	Olds Custom Cruiser	A4	307	8
22	Olds Custom Cruiser	D-A4	350	8

NAFA Car Categories

Sub-Compact: Wheelbase of less than 100 inches and a curb weight of under 2,300 pounds.

Compact or Small: Wheelbase between 100 and 106 inches and a curb weight of between 2,300 and 2,799 pounds.

Mid-Size: Wheelbase between 106 and 114 inches with a curb weight of between 2,800 and 3,399 pounds.

Large: Wheelbase of more than 114 inches and a curb weight of more than 3,400 pounds.

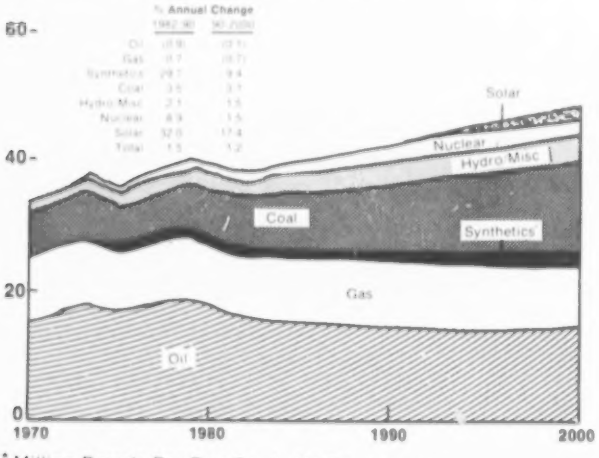
Chevron's Energy Forecast:

Supplies Will Meet Demand

The supply of energy is a major concern, not only to fleet managers but also to all corporations and government agencies in the United States and Canada. While forecasting energy supplies is an inexact science at best, the Economics Department of the Standard Oil Company of California recently published its findings in a publication entitled "World Energy Outlook." This article is based on its forecast.

In the years since 1973 the world energy picture has undergone a series of profound changes. Since 1978, the rate of change accelerated and the following events occurred: a major oil supply disruption followed by an extended period of excess supply, rapid price increases resulting in a conservation response of a magnitude once deemed inconceivable, and a major economic response not entirely unrelated to energy price increases. Oil inventories have jumped from low levels to high levels and back again.

U.S. Energy Consumption MB/D C.O.E.*



* Million Barrels Per Day Crude Oil Equivalent

For the first time, OPEC has exhibited many of the characteristics of a cartel, making large and rapid price increases in times of shortages and supply cuts to support prices in times of surplus.

The future will certainly witness upsets similar to those of the recent past. Periodic but unpredictable events such as political or military actions, economic cycles, and natural disasters will affect world oil supply and demand. If demand grows to approach the physical limts of oil supply, the frequency and severity of these upsets will have a disproportionate impact. Fortunately, the outlook is that the world will not reach the physical limits of oil supply until well into the 21st century.

As recently as 1978, OPEC crude oil production was forecasted to rise significantly in the 1980's and to peak in the 1990's. This production profile was considered feasible based upon generally accepted estimates of the total resource base. In the intervening years, the conservation response to sharply higher prices has resulted in a flattening of this curve.

OPEC crude oil production is now estimated to grow only to about 26 million barrels per day by the year 2000. When compared to the 1978 profile, this new curve defers the production of approximately 150 billion barrels of oil into the next century and postpones the time when world oil supply approaches physical limits. This fundamental change makes this forecast more optimistic about the longs run world oil supply and demand balance.

Decline in free world primary oil consumption began in the wake of the large price increases of 1979 and 1980. It is expected to continue with a 1.7 percent decline in 1982, following a 4.8 percent decrease in 1981. Consumption in 1982 is forecasted at 46 million barrels per day; 6.0 million barrels per day below the 1979 peak.

Price-induced conservation is having a greater affect on consumption than previously appre-

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(Continued from page 30)

ciated. Past price increases are still working their way through all oil consuming sectors in the form of more fuel efficient autos, altered driving habits, added home insulation, higher efficiency appliances, and greater industry energy efficiency.

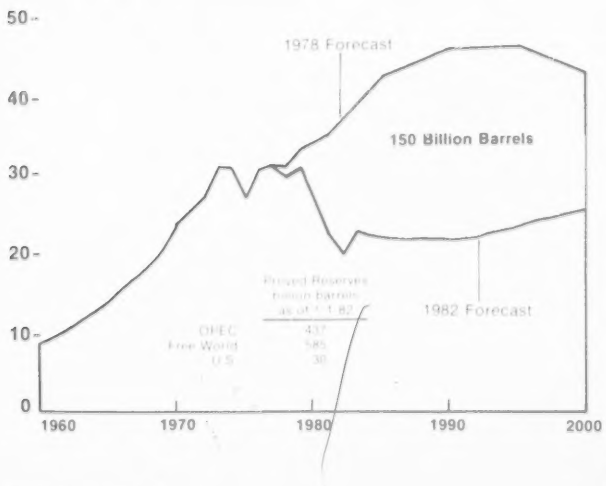
Switching to alternative or more reliable energy sources, such as natural gas and coal, has further reduced oil consumption. This effect is particularly pronounced in the northeast and middle Atlantic states where conversion to natural gas in residential heating has increased in the past four years. Many electric utilities have been able to switch from oil to gas in the U.S. and the Netherlands because of ample supplies of this cheaper fuel. In Japan, industrial consumers have shifted to coal to diversify their sources of energy.

"...OPEC has exhibited many of the characteristics of a cartel, making large and rapid price increases in times of shortages and supply cuts to support prices in times of surplus."

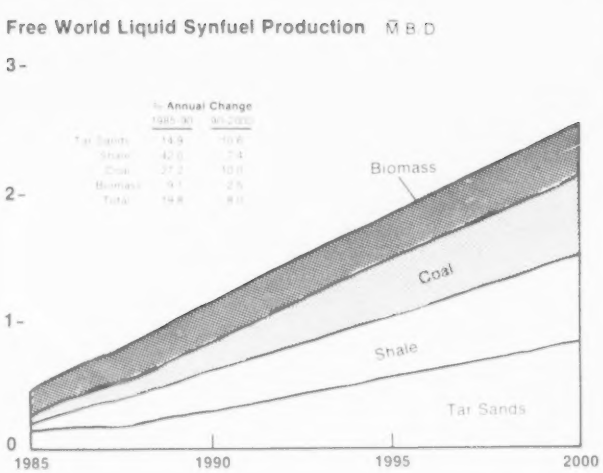
The depressed state of the world's economy has had its affect on energy demand, including oil. Many energy intensive industries, such as steel, aluminium, petroleum, forest products, and automobiles, are operating substantially below capacity. The resultant Unemployment and loss of consumer income have driven oil demand even lower.

During the past year a significant change has taken place in the outlook for synthetic fuels and alternative energy projects. This forecast indicates an adequate supply of oil for the remainder of the century with less upward pressure on world oil prices. The present expectation of lower oil prices

OPEC Crude Oil Production MBD



Free World Liquid Synfuel Production MBD



makes the major investments required for many synthetic fuels and alternative energy projects look considerably less profitable. As a result, a number of projects have recently been cancelled or postponed.

The synthetic fuels contribution to future energy supply is substantially below that which was presented last year. Total free world production of synthetic liquids is now estimated to grow from about 0.5 million barrels per day in 1985 to 2.5 million barrels in 2000. In the U.S. the outlook is for synthetic liquids production of about 750,000 barrels per day in 2000. Additional postponements could reduce this level even further. The effect of these changes has been to lengthen the development phase of synthetic fuels projects by about five to 10 years.

The delay in development of a viable synthetic fuels industry would appear to be of concern to all nations depending on imported oil. These nations, however, benefit from the factor that has caused the delay: lower world oil prices.

There is still a risk that a larger, sudden decrease in world oil supply of significant duration could force oil prices well above the level needed for economic justification of synthetic fuels plants. The long lead times necessary for construction of these plants would permit high oil prices to be sustained for years. This risk is an appropriate concern of national governments, and some steps, such as the establishment of strategic petroleum reserves, have already been taken. Some governments are experimenting with various forms of subsidy to stimulate earlier development of a significant synthetic fuels industry.

The postponement of the need for commercial scale synthetic fuels plants allows more time for research and development of less expensive ways to solve the huge technical, logistical, and environmental problems associated with this new industry. Most governments are being properly cautious in not over-subsidizing development of commercial plants on a crash basis before the technology is proven. ■

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